# THE JOURNAL OF GAS LIGHTING
## WATER SUPPLY & SANITARY IMPROVEMENT

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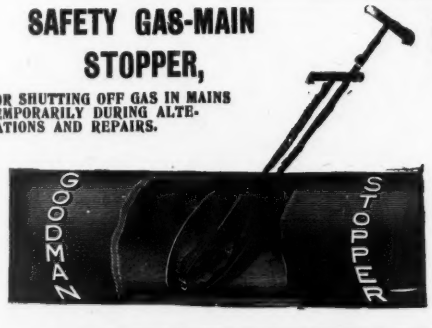


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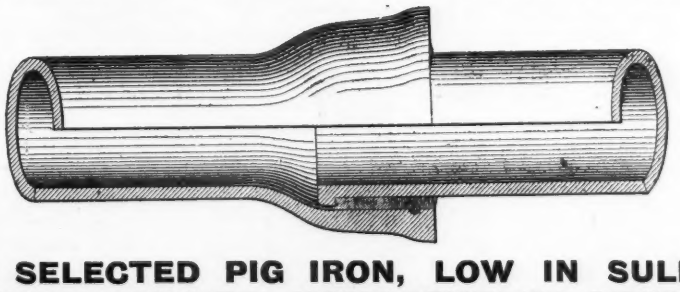

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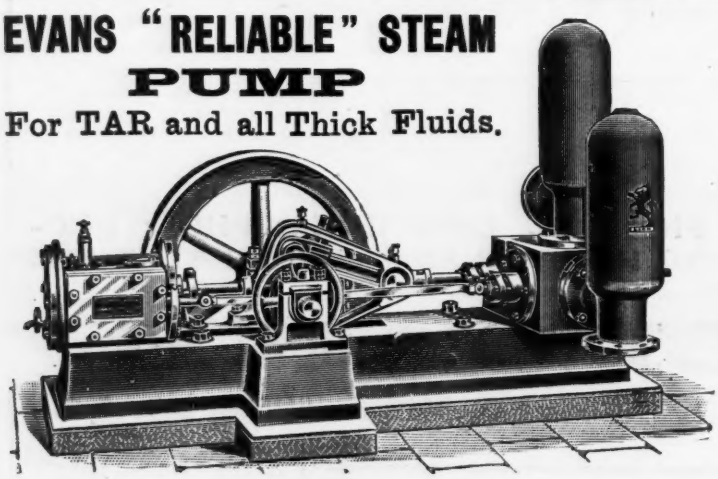

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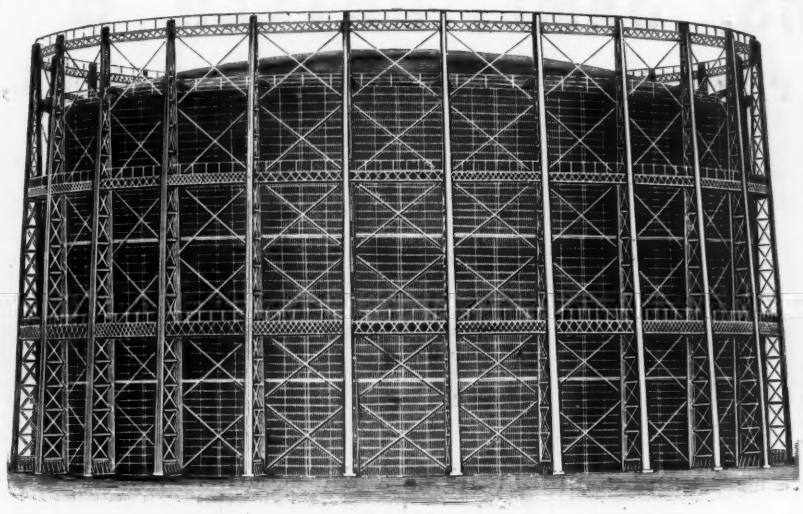

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LAMP COLUMNS with Meter Bases.

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***For any System of Gas Lighting.***

# MAIN LAYING.

Paper by **PERCY GRIFFITH, M.Inst.C.E.**, and **BRUCE McGREGOR GRAY, Assoc.M.Inst.C.E.**, before the Association of Water Engineers.

**A.** The Authors used *Flanged Pipes* for the Rising Main up the Steep side of the Barff, and their experience proved that this was not an advantage, as *the rigidity of the Joints involved considerable difficulty* in regard to the depth of the Trench, and a good deal of Cutting to make the final Connections at each end of the Pipe-Line.

**B.** In the case of the Delivery Main, the Joints were *Ordinary Socket Joints*, but made with Lead only. The only difficulty met with here was the necessity for *pouring the Lead in* at a suitable temperature *to prevent it melting the Solid Lead Fillet*, and *running through into the Pipe.*

**C. In some of the Smaller Branch Connections, Lead Wool was used, and proved highly successful.**

*Particulars from*

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**(Patent)**

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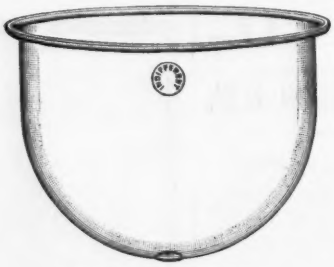

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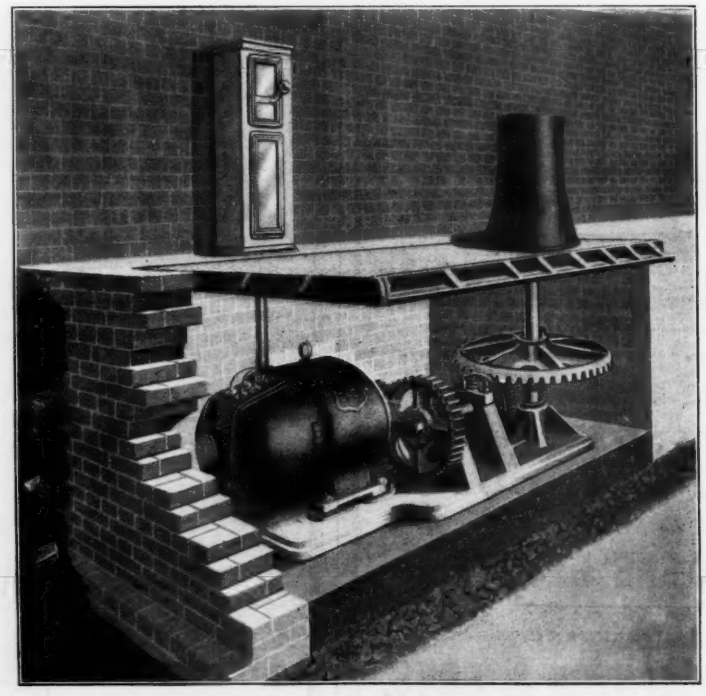

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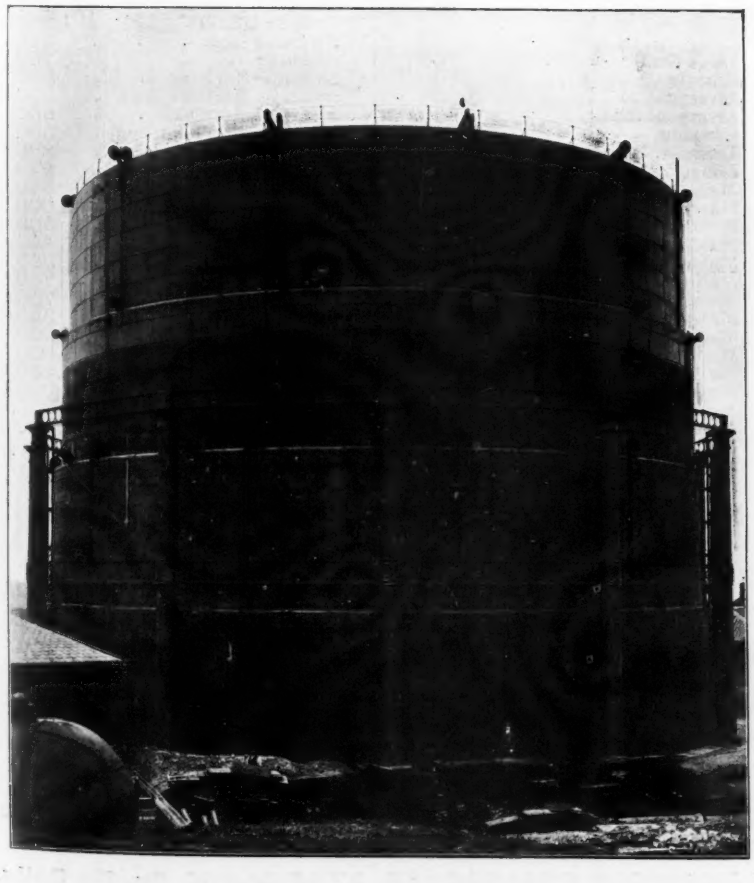

## RECONSTRUCTION OF AYRES QUAY GAS-WORKS, SUNDERLAND.

(See "Gas Journal," July 6, 1909.)

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**100-FEET DIAMETER,**
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| Agram, Croatia | 200,000 |
| Alkmaar, Holland | 400,000 |
| Allenstein, Germany | 200,000 |
| Antwerp, Belgium | 1,500,000 |
| Antwerp (2nd) | 1,000,000 |
| Ashford | 250,000 |
| Augsburg, Bavaria | 425,000 |
| Aylesbury | 150,000 |
| Barmen-Rittershausen | 500,000 |
| Barrow | 300,000 |
| Bath | 1,000,000 |
| Belfast | 1,700,000 |
| Belfast (2nd) | 4,500,000 |
| Benrath, Germany | 125,000 |
| Berlin—Charlottenburg | 2,500,000 |
| Berlin—Rixdorf | 650,000 |
| Berlin—Rixdorf (2nd) | 700,000 |
| Berlin—Tegel | 3,500,000 |
| Berlin—Tegel (2nd) | 6,350,000 |
| Bilston | 375,000 |
| Birmingham | 1,500,000 |
| Bishop's Stortford | 200,000 |
| Bochum, Westphalia | 530,000 |
| Bognor | 100,000 |
| Bordentown, N.J. | 125,000 |
| Bournemouth | 1,000,000 |
| Bournemouth (2nd) | 500,000 |
| Bremen, Germany | 550,000 |
| Bremen (2nd) | 950,000 |
| Bremen (3rd) | 850,000 |
| Brentford | 1,200,000 |
| Brentford (2nd) | 850,000 |
| Bridgwater | 200,000 |
| Bridlington | 150,000 |
| Bridlington (2nd) | 200,000 |
| Brieg, Silesia | 100,000 |
| Brighton | 1,750,000 |
| Brighton (2nd) | 1,850,000 |
| Bromley | 1,500,000 |
| Bruges, Belgium | 200,000 |
| Brussels—Anderlecht | 350,000 |
| Brussels—Anderlecht (2nd) | 350,000 |
| Brussels—Forest | 1,000,000 |
| Brussels—Koekelberg | 1,000,000 |
| Brussels—St. Gilles | 1,000,000 |
| Brussels—St. Josse | 1,000,000 |
| Brussels—St. Josse (2nd) | 600,000 |
| Brussels—Ville | 750,000 |
| Brussels—Ville (2nd) | 750,000 |
| Brussels—Ville (3rd) | 1,500,000 |
| Brussels—Ville (4th) | 350,000 |
| Bucarest, Roumania | 1,100,000 |
| Budapest, Hungary | 50,000 |
| Budapest (2nd) | 1,750,000 |
| Carlisle | 600,000 |
| Carlsruhe, Germany | 500,000 |
| Chigwell | 350,000 |
| Chorley | 300,000 |
| Commercial, London | 850,000 |
| Commercial (2nd) | 850,000 |
| Commercial (3rd) | 1,250,000 |
| Commercial (4th) | 2,000,000 |
| Copenhagen | 700,000 |
| Copenhagen (2nd) | 2,500,000 |
| Courtral, Belgium | 250,000 |
| Coventry | 600,000 |
| Coventry (2nd) | 600,000 |
| Cracow, Galicia | 200,000 |
| Cracow (2nd) | 200,000 |
| Crefeld, Germany | 500,000 |
| Croydon | 1,250,000 |
| Croydon (2nd) | 625,000 |
| Croydon (3rd) | 625,000 |
| Croydon (4th) | 550,000 |
| Debreczin, Hungary | 100,000 |
| Deventer, Holland | 150,000 |
| Deventer (2nd) | 200,000 |
| Dorking | 150,000 |
| Dublin | 2,000,000 |
| Dublin (2nd) | 2,000,000 |
| Dublin (3rd) | 650,000 |
| Dundee | 1,500,000 |
| Dunedin, N.Z. | 150,000 |
| Dunedin, N.Z. (2nd) | 275,000 |
| Durham | 200,000 |
| Düsseldorf, Germany | 1,000,000 |
| Eastbourne | 1,250,000 |
| Edinburgh | 2,000,000 |
| Epsom | 225,000 |
| Epsom (2nd) | 300,000 |
| Falmouth | 150,000 |

| | Cubic Feet Daily. |
|---|---|
| Faversham | 200,000 |
| Flensburg, Sleswig | 300,000 |
| Forst, Brandenburg | 300,000 |
| Frankenthal, Germany | 175,000 |
| G. L. & C. Co. Beckton | 2,250,000 |
| G. L. & C. Co., ,, (2nd) | 10,750,000 |
| G. L. & C. Co., Bromley | 3,750,000 |
| G. L. & C. Co., Fulham | 1,750,000 |
| G. L. & C. Co., ,, (2nd) | 750,000 |
| G. L. & C. Co., Nine Elms | 2,750,000 |
| Gablonz, Austria | 140,000 |
| Gelsenkirchen, Westphalia | 175,000 |
| Gelsenkirchen (2nd) | 350,000 |
| Geneva, Switz. | 500,000 |
| Gosport | 200,000 |
| Göteborg, Sweden | 300,000 |
| Göteborg (2nd) | 600,000 |
| Graudenz, Prussia | 200,000 |
| Guildford | 350,000 |
| Guildford (2nd) | 200,000 |
| Haarlem, Holland | 850,000 |
| Hamburg, Germany | 1,750,000 |
| Hampton Court | 500,000 |
| Hampton Court (2nd) | 600,000 |
| Hartlepool | 750,000 |
| Hebden Bridge | 200,000 |
| Heidelberg, Germany | 200,000 |
| Holyoke, Mass. | 600,000 |
| Hong Kong | 450,000 |
| Hull | 1,500,000 |
| Ilford | 650,000 |
| Innsbruck, Austria | 200,000 |
| Ipswich | 750,000 |
| Kampen, Holland | 350,000 |
| Kiel, Sleswig | 1,000,000 |
| Kiel (2nd) | 880,000 |
| L. & N.W. Rly., Crewe | 700,000 |
| Lausanne, Switz. | 250,000 |
| Lawrence, Mass. | 400,000 |
| Lea Bridge | 350,000 |
| Lea Bridge (2nd) | 350,000 |
| Lea Bridge (3rd) | 400,000 |
| Lea Bridge (4th) | 1,000,000 |
| Leeuwarden, Holland | 400,000 |
| Leiden, Holland | 500,000 |
| Leiden (2nd) | 575,000 |
| Leigh, Lancs. | 350,000 |
| Lemberg, Galicia | 260,000 |
| Lemberg (2nd) | 500,000 |
| Liége, Belgium | 1,000,000 |
| Liége (2nd) | 750,000 |
| Lincoln | 500,000 |
| Liverpool | 3,500,000 |
| Liverpool (2nd) | 4,500,000 |
| Longton | 600,000 |
| Louvain, Belgium | 800,000 |
| Lübeck, Germany | 400,000 |
| Maastricht, Holland | 200,000 |
| Magdeburg, Germany | 1,400,000 |
| Maidenhead | 225,000 |
| Maidenhead (2nd) | 225,000 |
| Maidstone | 500,000 |
| Malines, Belgium | 500,000 |
| Malmö, Sweden | 350,000 |
| Malta | 400,000 |
| Manchester | 3,500,000 |
| Manchester (2nd) | 3,500,000 |
| Marlborough | 100,000 |
| Mayence, Germany | 700,000 |
| McKeesport, Pa. | 500,000 |
| Merthyr Tydfil | 300,000 |
| Middlesbrough | 1,250,000 |
| Namur, Belgium | 175,000 |
| Nelson | 400,000 |
| Newburgh, N.Y. | 600,000 |
| New York | 5,200,000 |
| Nictheroy, Brazil | 250,000 |
| North Middlesex | 150,000 |
| North Middlesex (2nd) | 200,000 |
| North Middlesex (3rd) | 75,000 |
| Norwich | 1,000,000 |
| Norwich (2nd) | 300,000 |
| Norwich (3rd) | 500,000 |
| Nottingham | 1,000,000 |
| Nuneaton | 125,000 |
| Oberhausen, Germany | 175,000 |
| Oldenburg, Germany | 200,000 |
| Ostend, Belgium | 100,000 |
| Ostend (2nd) | 200,000 |
| Perth, W.A. | 125,000 |
| Poole | 1,500,000 |

| | Cubic Feet Daily. |
|---|---|
| Port Elizabeth, S.A | 400,000 |
| Portsmouth | 1,000,000 |
| Posen, Germany | 450,000 |
| Posen (2nd) | 700,000 |
| Prague, Austria | 140,000 |
| Preston | 1,400,000 |
| Reading | 1,000,000 |
| Redhill | 275,000 |
| Redhill (2nd) | 300,000 |
| Reichenberg, Bohemia | 200,000 |
| Reichenberg (2nd) | 200,000 |
| Revel, Russia | 350000 |
| Rhymney Valley | 175,000 |
| Romford | 300,000 |
| Romford (2nd) | 350,000 |
| Rotterdam, Holland | 850,000 |
| Rotterdam (2nd) | 1,500,000 |
| Rotterdam (3rd) | 750,000 |
| Rotterdam (4th) | 750,000 |
| Rotterdam (5th) | 600,000 |
| St. Albans | 700,000 |
| St. Gallen, Switz. | 225,000 |
| St. Gallen (2nd) | 225,000 |
| St. Joseph, Mo. | 750,000 |
| San Paulo, Brazil | 700,000 |
| Santiago de Cuba | 400,000 |
| Scarborough | 800,000 |
| Schwelm, Westphalia | 100,000 |
| Shanghai | 225,000 |
| Shanghai (2nd) | 225,000 |
| Shanghai (3rd) | 1,600,000 |
| Southampton | 800,000 |
| Southampton (2nd) | 500,000 |
| Southampton (3rd) | 600,000 |
| Southgate | 400,000 |
| Southport | 750,000 |
| Southport (2nd) | 900,000 |
| South Shields | 650,000 |
| Stafford | 500,000 |
| Staines | 600,000 |
| Stettin, Germany | 880,000 |
| Stockholm | 1,500,000 |
| Stockholm (2nd) | 1,750,000 |
| Stockport | 600,000 |
| Stockport (2nd) | 600,000 |
| Stockport (3rd) | 400,000 |
| Stockton-on-Tees | 500,000 |
| Swansea | 750,000 |
| Swansea (2nd) | 1,000,000 |
| Swansea (3rd) | 450,000 |
| Swindon | 300,000 |
| Sydney—Harbour | 500,000 |
| Sydney—Harbour (2nd) | 500,000 |
| Sydney—Mortlake | 500,000 |
| Sydney—Mortlake (2nd) | 500,000 |
| Syracuse, N.Y. | 850,000 |
| Taunton | 225,000 |
| Taunton (2nd) | 350,000 |
| The Hague Holland | 1,000,000 |
| The Hague (2nd) | 500,000 |
| Tilburg, Holland | 400,000 |
| Torquay | 350,000 |
| Tottenham | 750,000 |
| Tottenham (2nd) | 750,000 |
| Tottenham (3rd) | 350,000 |
| Tottenham (4th) | 1,000,000 |
| Tottenham (5th) | 1,000,000 |
| Tottenham (6th) | 1,250,000 |
| Tunbridge Wells | 1,000,000 |
| Utrecht, Holland | 1,000,000 |
| Utrecht (2nd) | 1,000,000 |
| Verviers, Belgium | 1,000,000 |
| Vienna | 3,500,000 |
| Vienna (2nd) | 2,500,000 |
| Waltham | 400,000 |
| Wandsworth & Putney | 1,800,000 |
| Watford | 300,000 |
| Watford (2nd) | 350,000 |
| Wellington, N.Z. | 350,000 |
| West Bromwich | 550,000 |
| West Ham | 1,500,000 |
| West Ham (2nd) | 800,000 |
| Weston-super-Mare | 350,000 |
| Weston (2nd) | 350,000 |
| Wexford, Ireland | 100,000 |
| Wiesbaden, Germany | 850,000 |
| Winchester | 225,000 |
| Winchester (2nd) | 125,000 |
| Wolverhampton | 1,500,000 |
| Zwolle, Holland | 200,000 |
| Zwolle (2nd) | 200,000 |

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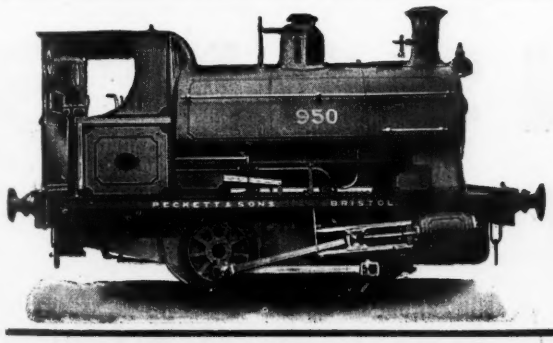


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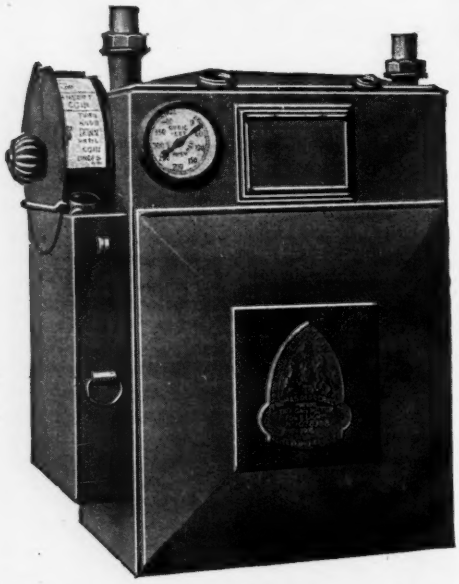

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# JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

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VOL. CVII., No. 2418.—TUESDAY, SEPTEMBER 14, 1909.


## EDITORIAL NOTES—GAS, &c.

### Continuous Carbonization on the Large Scale.

IN another part of the "JOURNAL," an outline description is given of the first installation on the large scale of the Woodall-Duckham continuous system of carbonization in vertical retorts. This plant is at the Kensal Green station of the Gaslight and Coke Company; but it is only in advance by two or three weeks of the installation (smaller by merely one bed of four retorts) at the Burnley Corporation Gas-Works. The ten settings of four retorts, the rearing of which is now almost completed, with the ancillary plant, at Kensal Green, will have a nominal carbonizing capacity of 100 tons of coal a day; but the productive capacity may be taken at not less than 1¼ million cubic feet, which is twice as much as was produced formerly on the same ground area with horizontal retort working. Technically, this is a very interesting point to gas engineers suffering from confined works, and with no land adjacent available for annexation. With vertical retorts—coal feeding being on the top of the bench, and coke removal going on directly under the bench—the margin of ground space around need not be more than is essential for facile inspection, and repairing and reconstruction work. This enables the capital outlay on structures for the housing of the carbonizing plant to be brought down to the minimum in relation to output.

Where coke-conveyors are adopted in connection with the continuous system, the modest requirement in respect of labour is another feature; as a matter of fact, one cannot be quite sure yet as to the point, until there has been further experience, at which it can be said that the utmost possible in labour economy has been realized. In this first section of plant, there are only 40 retorts fed and discharged mechanically; and they will carbonize a minimum quantity of 100 tons of coal a day, with only three men on duty per shift. When the second section is erected, if the working of the present installation fulfils all expectations, it is quite possible the total number of men required on the complete installation will be proportionately less in relation to the quantity of coal carbonized.

A survey of the Kensal Green settings shows us that the extended experience with the latest alterations in the coke-extracting devices and other improved details has revealed nothing requiring modification in designing the larger plant, excepting in a minor point or two. At these works, the installation will have every possible chance. The auxiliary plant throughout—from condensers and exhausters to gas-holders—will, with the new settings, constitute a complete gas-works. And as the working of the plant will be under the supervision of the Chief Engineer of the Gaslight and Coke Company (Mr. T. Goulden) and the direct control of the Station Engineer (Mr. A. S. Baker), there is assurance that there will be nothing fictitious or assumed about the records that, it may be confidently expected, will hereafter be published. The system has here a fine opportunity of proving itself; and there can be no doubt that, when the plant has settled down to work, Kensal Green will be a Mecca for gas engineers who are stationed in the south and in the Midlands, as, similarly, Burnley will be for engineers northward.

We hope that Messrs. Woodall and Duckham will now reap the reward of their years of ardent industry in perfecting a system of continuous carbonization involving so many intricate problems. They have trodden paths in coal carbonization for the production of gas that have never been trodden before; and though there has been much to dishearten, there has been an exhaustless and unsuppressible perseverance in gaining the desired goal. Their honour, no one can gainsay, is great; we wish for them something more tangible in the commercial competition upon which they have now entered with a full belief in the virtues of what they have to offer.

### Capital and Labour.

SOCIALISM in all its nakedness has been the dominant feature at the Trades Union Congress at Ipswich during the past week. It is a matter for profound regret that the old protective objects of the trades unions, to which there could be no genuine objection when prosecuted and guarded with a just consideration for the rights of all men, are fast receding to a secondary place, and that the foremost position is now being occupied by ultra-socialism. The President of the Congress (Mr. D. J. Shackleton, J.P., M.P.) is one of the best disposed and most cultured of the labour party in the House of Commons; and, unlike many of his contemporaries and colleages, his education has not been mainly confined to the teachings of the pernicious "Red Flag" literature that now abounds. Still we have it from Mr. Shackleton's own lips that he is pleased and delighted that the trades unions have now left their old legitimate paths, and have diverted their interests into the ways that are bestrewn with the political and social questions of the present day. That is where many thoughtful men will join issue with the President. Far better would it have been, for labour and for the country, had trade unions kept themselves, as organized bodies, aloof from purposes other than those for which they were originally and specifically brought into being, and left the political questions to be dealt with by political organizations to which the individual worker could have freely given adherence according to his bent of mind and sympathies. There is not the slightest objection to labour being represented on the floor of the House by 53 members, if those representatives were at liberty to exercise their own discretion, and were not merely automatons whose actions are entirely under separate control. They may be sent to Parliament so as to voice the aspirations and desires of organized labour; there is nothing particularly objectionable about that, except that thereby their work in the House is limited to the interests of a single class, while the interests of all their other constituents are matters of almost absolute indifference to them. The aspirations and desires of the worker as represented by the majority of the labour party, are that all humanly begotten benefits shall go to the worker; and that is the essence of Socialism as understood by members of that party. Their creed can be further summarized by the one word, selfishness. It is impossible from observation—we are sorry for it—to endorse Mr. Shackleton's claim that a wider and more generous view is now taken by the party (the President used the words "trades unionists") of their duties as citizens.

The budget that Lord Rosebery denounces, in the plainest language, as being purely socialistic, is a *magnum opus* at the Trades Union Congress—in fact, it is the greatest financial reform of modern times. The revenue of this budget, Mr. Shackleton claims, shall go to the poor; while Lord Rosebery tells us that the budget, if it succeeds, will mean an increase in unemployment owing to the depletion of capital from which wages alone are paid. Sir Daniel Ford Goddard, one of the representatives of Ipswich in Parliament, and the Chairman of the Ipswich Gas Company, was among those who gave cordial welcome to the delegates at the Congress. In his welcoming speech, he remarked that he understood the delegates did not desire to destroy the peaceable relations which exist between employers and employed for the sake of spoliation or the picking of a quarrel. He also later extended generous hospitality to the delegates in the grounds of his own house. At an open-air meeting, held in connection with the Congress, Sir Daniel was described as one of "the products of the capitalist system." There need be no pointing of these comparisons, and exchanges of estimates of purposes and position. It may be courteous, but there is little use in taking a benevolent view of the objects of the Congress, and holding them up for veneration as being peaceable, now that the Congress has been changed into the largest socialistic platform yet constructed, and when throughout the proceedings there is every evidence of an implacable hatred of capitalists, a wild sowing of the seeds of discord, and the very men who have worked to provide capital for giving

employment are reviled for having capital in their possession. "Nature hath fram'd strange fellows in her time;" and some of them were to be seen and heard at the Congress. Without capital, where would labour be? There is only one answer. Yet the dissipation of capital, if many of the delegates at the Congress really meant what they said, would be the outcome of the programme of present-day Socialism. Mr. Shackleton spoke of the steps that have been taken, in conjunction with Oxford, to impart a higher education to working men, which "will give them a clearer knowledge of "the social, economic, and industrial history of the national "and local affairs of our country." This is to be welcomed, if it opens the eyes of the mind of the worker to the fact that war between capital and labour is not to the advantage of the country; and that the economic and industrial conditions of our land are not best served by such legislation as the Coal Mines (Eight Hours) Act, and that which is projected for enforcing a universal eight hours' working day.

## Coal Stocks and the Outlook.

As the weeks pass, proof accumulates that the Coal Mines (Eight Hours) Act has been a huge error. Never has there been a measure within recollection that has had parallel with this in the creation of disturbance in a section of the industrial world. What will happen when the Act comes into force in Durham and Northumberland on New Year's Day is at the present time a nebulous matter. All may be well, or just the reverse. In many other coal areas, there have been, since June, strained relations between masters and men; there has been cessation of work at several collieries; recourse has been had to legal remedy over grievances; there has been legal reference in regard to the interpretation of sections of the Act (one of which as to the sixty hours extra working per annum is still in the balance); open rupture has occurred on questions of pay and other conditions; and above all there have been rumours and threats of a great national conflict, culminating in the immense parade of the miners' power over the Scotch wages difficulty. The Act scores heavily in its disturbing and perplexing influences; and the responsibility on those who introduced the measure, and forced it upon an unwilling country, is weightier than it must be pleasant for them to contemplate. Prediction by the adversaries of the measure has not been in any particular falsified by events. The smooth working that was prophesied by the Home Secretary has not been fulfilled. Reduction of output has been experienced; the degree of gradient to higher working costs has been greater than was anticipated; and still larger payment is being claimed by miners on the most slender of pretexts. Not long since it was expected that Wales would be in the throes of trouble through differences between masters and men; and though there was a settlement of the point then at issue, men and masters are again on the verge of a complete rupture. Discontent exists almost everywhere in the coal-fields; and that discontent is fomented by the men's leaders—in one way, by advice to lose no opportunity for raising the minimum wage.

There is no wish on our part to pose as, or to be deemed, alarmists; but we do say that, within the horizon of the observant, there are sufficient indications to suggest the wisdom of taking every precaution in respect of the coming winter's supply. It has been stated at several gas companies' meetings lately that the quantity of coal held in reserve has been above the normal owing to the unrest in the coal-fields; and some chairmen have spoken as though the need for this precaution has been extinguished by the acceptance of pacifying terms, over certain questions, in Wales and Scotland. That, it may be said emphatically, is a mistake. The revival of disagreement on fresh points in Wales does not encourage confidence; and, above all, there are the uncertainties as to what will happen when the Act comes into force on Jan. 1 in Durham and Northumberland, and generally through the recognition in the Scotch settlement of the principle of a higher minimum wage. Taking these matters into consideration, it would be the height of imprudence to yet reduce stocks to the normal level for the time of the year. Though finances might not allow the miners to continue a national strike for any length of time, a few weeks' complete stoppage, with the succeeding disorganization of supplies and transport, in the depth of winter would put not a few gas undertakings in a tight corner. It would then be every consumer for himself. The schemes to terminate industrial disputes without absolute rupture are many; but there may be occasions when even they will fail.

## Specialization and Commercialism.

Writing recently in these columns on the subject of the distribution department, it was pointed out how important this has become in the making or marring of the fortunes of gas undertakings; and that the responsibility for the proper conduct of the department in all but the small undertakings is such that it requires at its head an officer who has specialized both technically and commercially in the work. A very thoughtful paper bearing upon the same subject was read, at the last annual meeting of the Illinois Gas Association, by Mr. Lucius S. Bigelow; and a few extracts from it are given in other columns. Mr. Bigelow has done an excellent part in advancing gas commercialism in America; and he is as keen as ever over the cause he champions. But he sees the danger of over-specializing in the commercial field as in the technical field. We are with him. Too rigid specialization, to the exclusion of all else, is not good either for the officer or the undertaking he serves. Sir J. J. Thomson, in his presidential address the other day to the British Association, spoke to the effect that premature specialization in one subject may produce remarkable knowledge, but it dulls enthusiasm; and no greater evil than to dull enthusiasm can be done to young men. Those words may well be applied to this subject of commercialism. The engineer specializing in a branch of the profession is the better for being a good commercial man; and a good commercial man who has also a technical knowledge of the work to which he has put his hand is a more valuable officer than the one who has not. The knowledge beyond the purely commercial or technical work as the case may be unconsciously produces an enthusiasm that is not experienced by the man who has rigidly specialized, and has possibly little value outside his special work. Take the salesmen, for instance, in gas show-rooms. We have found some who are skilful salesmen and charming talkers, but who, so far as their technical knowledge of the subjects of gas lighting, cooking, and heating goes, could be easily floored by a tyro in these matters, and could be made the butt of anyone interested in a competing agent. In specializing for gas commercialism, it is essential that the knowledge of the work should be thoroughly impregnated, and not merely veneered, technically. The commercial man with technical qualification has a large field before him; and his earning power should be good.

## Gas Furnaces and Engines in Industry.

The competitors of town gas—suction-gas plant makers and purveyors of electricity—would have manufacturers believe that the use of town gas for industrial purposes is a decadent one. The statement must be seriously rebutted as frequently as it is unscrupulously made; and there is no better way of rebutting it than by securing the business—no matter how small the consumption—of providing heat and power for all industrial purposes to which gas is suitably applicable. It is surprising, the more one looks into this question of the application of gas to industrial purposes, what a number of diverse objects there are in connection with which gas can be of useful and profitable service. Sheffield, of course, is in an exceptionally favoured position in this regard; but a few sentences from the speech of Mr. Wilson Mappin at the meeting of the Sheffield United Gas Company the other day, illustrates the extent in that district of the field of industrial utility that gas has independent of power purposes. The Company are doing a considerable business in and through gas-furnaces; and about forty additional ones have been recently fixed. Among the purposes for which the furnaces are used are: Brass casting, silver melting, annealing dies, table-blade forging, bayonet forging, file hardening, testing steel, forging cutters, forging miners' drills, case-hardening, hardening chisels and twist drills, forging forks, forging files, tempering knives, &c. This is a pretty good chain of uses; but it is only representative—nothing more.

No one has more right to attention than Mr. Wilson Mappin when talking on this subject; and when he tells us that there is hardly a manufacturing firm in Sheffield who would not find it advantageous to use gas-furnaces for one purpose or another, then it may pay readers to pause and inquire whether his words do not apply—perhaps not in all cases in the matter of furnaces, but in other directions in which heat is required—to manufacturers in their own areas of supply. It was only the other week that the Chairman of the Commercial Gas Company (Mr. W. G. Bradshaw) was directing attention to the growing use of gas for the heating of crucibles in the East-end of London; and no doubt some

very interesting experiences could be quoted from numerous other districts throughout the country. It is, however, a business that requires cultivating and advertising. Manufacturers are, as a rule, difficult to wean from the customs and traditions of their operations. The Sheffield Company at all events are not going to miss this business for the want of advertising and demonstration. They have gas furnaces on show, to which manufacturers have been invited to bring material for the purpose of testing the capabilities of the furnaces. We had the curtain lifted on the gas business methods fostered by the Managing-Director of the Sheffield Company (Mr. Hanbury Thomas), in the presidential address of Mr. J. W. Morrison to the Manchester Institution of Gas Engineers at the end of last February (at which time reference was also made to the gas-furnace connections of the Company); and here we have another example of the wisdom and energy with which the gas business is being cultivated in this great industrial centre.

While the Sheffield Gas Company have an exceptionally good area for industrial business, they have also an exceptionally low price to offer; and this accounts for the continued growth of the power business. When Mr. Morrison was addressing the Manchester Institution six months or so ago, he only knew of one suction-gas plant in the broad supply area of the Company; and their power business continues to expand—the sale for motive power purposes during the last twelve months having been nearly 346 million cubic feet, which is an enlargement by some 14¼ millions, while 29 additional engines were connected with the mains. Though this successful application of gas to industry is traceable to the already low price, the Company are not desirous of being tied to anything that may prohibit them taking the fullest advantage of all fresh economies in manufacture. Hence their intention to proceed by Provisional Order to have their standard of illuminating power reduced, with the application in testing of the "Metropolitan" No. 2 burner. It is the declared intention of the Company not to take full advantage of the new conditions. All they want is liberty to serve the interests of Sheffield in the most economical manner. They have done well by the city in the past; and this is the continuation of the established policy under the changed circumstances, and extended applications, of distributed gas.

## "Metallic Filament" Gas-Mantles.

Much interest has been evinced in the article that appeared in the "JOURNAL" for the 24th ult. (p. 503) announcing the arrival, though not actually on sale yet, of a metallic filament gas-mantle. At the time the description of the mantle appeared, we stated that there had not been an opportunity of seeing the illuminating effect of the mantle; but yesterday, just before going to press with this issue, Herr Reeser brought to the office a burner fitted with a piece of the metallic gauze fabric to give a little demonstration. The burner employed was an ordinary "C" one, with the primary-air chamber and inlets enlarged so as to give a greater supply of air—this being necessary with the metallic filament mantle. Though only a small piece of the fabric was used simply domed by the finger, and supported only by a collar round the top of the burner, the brilliance of the light was abundantly attested. After it was used, Herr Reeser pulled the fabric off, doubled it up, flattened it out, and otherwise unmercifully used it; and then replaced it on the burner, and ignited the gas again. The whole of this rough treatment had not produced a single fracture of the silk-like metallic filament fabric. It demonstrated completely its great flexibility and tenacity. About the ascribed useful life of the mantles, information was given in the article published on the 24th ult.; and an opportunity is going to be immediately afforded for putting the assertions to the proof, now that the necessary burners with larger air-supply are about available.

## Pipe Depths.

In "Notes from Westminster" recently (*ante*, p. 166), reference was made to the unreasonable requirements of certain county authorities in the matter of the reinstatement of roads after pipe-laying by gas companies. There is a growing and also unreasonable requirement by County Councils in respect of the depths at which pipes shall be laid, and to which as much resistance as possible should be offered. This is an old sore point—dating from the introduction of the heavier types of steam-rollers. In the Aldershot Gas and Water Company's Act, it is noticed that the Surrey County Council have secured the insertion of a set of clauses for their protection. One of these enacts that any main, pipe, or other work of the Company constructed under the Act, beneath the surface of any road, street, or bridge, or other highway, "shall, if reasonably practicable, be laid or constructed at such a depth that not less, in the case of a pipe of 6 inches or upwards, than 3 feet, and, in the case of pipes of smaller diameter, than 2 ft. 6 in. shall intervene between the surface of such road, street, bridge, or highway and the upper surface of any such pipe, conduit, or work." For pipes 6 inches in diameter, a depth of 3 feet between the road surface and the top of the pipes, and for pipes of a less diameter than 6 inches a depth of 2 ft. 6 in. is both unreasonable and unnecessarily costly. Less cover would quite suffice, without running the Council into any particular risk. In another clause the Council arrange that they shall not be liable for any injury or damage done to any work of the Company authorized by the Act by reason of it being laid at a depth below the surface of any main road insufficient for its protection from injury by the use of any steam or other roller of reasonable weight, having regard to the nature of the subsoil for the repair of such road, or by the passage of the traffic in such road. The Council have here safeguarded themselves in a generous and elastic manner; but it would not have injured their dignity if in framing the clauses they had given a little recognition to the fact that the Company, as well as the County Council, are rendering public service.

## Next Year at the White City.

Already Mr. Imre Kiralfy has commenced to prosecute his campaign for support for the Japan-British Exhibition next year, through which it is hoped to strengthen the already secure bonds that exist between this country and Japan. No doubt we shall all be happy to make closer acquaintance with the arts, products, and manufactures of our allies in the Far East, and they of ours. The Japanese Parliament, it is stated, has already voted 1,800,000 yen for the exhibition; and the Government of Formosa and the Local Prefectures have also voted large sums for the exhibition. If all that is promised reaches the stage of actuality, the exhibition will be a unique one, and consequently attractive to the country at large and to visitors from abroad. Any way, it should be something exceeding in merit and magnetism the exhibition of this year. From the information received from the exhibition authorities, we learn that the Japanese Government have already secured a large portion of the existing buildings and grounds; and a corresponding proportion of the remaining grounds and palaces has been thoughtfully reserved for a display of the arts, products, and manufactures of the British Empire. That is where our manufacturing readers come in; and the privilege of displaying their wares can be secured at the price of 6s. per square foot (including one frontage), and 10s. per foot for each additional frontage. A minimum charge for space of £20 is put upon individual exhibits, and £10 for collective ones. It is to be feared that, at this price, gas plant and appliance manufacturers will not give a second thought to attaching themselves to the White City for half next year; and we do not suppose that, whatever the price for space, a single holder, burner, cooking range, or fire would be sold in Japan in excess of what would otherwise be the case by exhibiting there next year. The exhibition will open on May 3 and continue to the end of October. If Dukes, Earls, Lords, Presidents of Chambers of Commerce and of certain learned Societies (but, with one or two exceptions, not of professional engineering societies), Lord Mayors, and Mayors, can make the projected exhibition go, then success is already assured; for, in addition to the Hon. President (Prince Arthur of Connaught) and the President (the Duke of Norfolk), the lists of Vice-Presidents and members of the General Committee are overflowing with the names of such notabilities.

## Failure of a National Strike.

In spite of all efforts that may be made by the Labour party to deny it, there can be no possible doubt that the national strike in Sweden, which was expected—in some quarters—to accomplish so much for the workers, has ended in their disastrous defeat A member of the Swedish Parliament (Mr. C. Lindley) attended last week's meeting of the Trades Union Congress, and made a statement in which he confessed that, though Labour was well

organized in that country, they had found the Capitalist class able to strongly resist. The strike had commenced last month, and had involved nearly 300,000 men and women, including the organized and a large number of unorganized workers of the country. Mr. Lindley appealed for help to continue the struggle; and the Congress passed a vote expressing "full sympathy" with the strikers in their struggle, and recommending the appeal to the practical support of the Trades Unionists of this country. The strike apparently never became the "general" one the men's leaders desired, for several classes of workers in important branches of industry did not come out; and the citizens themselves by prompt action, were successful in spoiling plans which had been carefully laid for disorganizing the life of the capital. The lesson is one which should not be lost on others who may be dreaming of the efficacy of a national strike as a remedy for industrial grievances. If, as Mr. Lindley is reported to have said, Sweden is the best organized country in the world from the labour point of view, and yet crushing disaster has met the agitators there, the logical conclusion is that a similar strike could not succeed elsewhere. The cause assigned for the failure—the powers of resistance of the capitalists—is no doubt largely the correct one; but then who besides the misguided strikers could have questioned the fact that they possessed this power? Much misery has been entailed upon the workers and their dependants, and more will have to be suffered by them, in finding out a single truth, of which they had been assured again and again by those who could see more clearly than they could that a strike of such a character could not in any case lead to betterment of labour conditions. Revolutionary tactics might have been successful in permanently dislocating the industry of the country; but fortunately for everybody concerned, a feature of the Swedish strike has been the absence of organized violence.

### The New Disturbance in South Wales.

As is remarked elsewhere, another trouble threatens the South Wales coalfield; and, in fact, to such a state have traders and others been wrought by the continued disturbances, that even one of the local papers remarks that "it is becoming increasingly clear that the sole satisfactory solution is to be discovered after all in a strike or lock-out." From the unsatisfactory relations between masters and men which have for a considerable time past existed in South Wales, the colliery industry has, says the newspaper referred to, "suffered to such an extent that it is the most natural of developments that a feeling is rapidly growing and spreading that a decisive conflict should be provoked, if necessary, to exorcise once for all the spirit of unrest which will render it impossible to make contracts at all if it persists much longer." As to whether this is the correct interpretation to place upon the latest move of the owners, we will not attempt to pass an opinion; but, whatever may be the underlying reason for the step, certain it is that the owners have cast something like a bomb into the camp of the men. Some days ago a circular was published by them, intimating that in a short time a resolution would be submitted at a meeting of the Coalowner's Association to serve notices on Oct. 1 either on all workmen employed at all the collieries connected with the Association, or only upon the workmen employed at collieries where the owners are unable to introduce an afternoon shift except by paying a bonus turn. It is explained that the men are prepared to work afternoon shifts on five of the six afternoons of the week; but they desire the sixth afternoon free, and payment at the rate of six turns for five turns work. If the notices are tendered, they would expire on Oct. 31. One can only regret that a paper which is published on the spot, and presumably is fully acquainted with all the circumstances, should feel compelled to conclude its reference to the subject by remarking that, "upon the whole the sharp and decisive settlement of the disturbance which would be the product of a strike is rather to be welcomed."

**Steam Displaced by Gas and Electricity.**—A new development, says "Progressive Age," quoting from a Washington paper, of greatest importance to the industrial world has been brought to light by the announcement that the United States Steel Corporation—the largest user of steam power in America, and perhaps in the world—have decided to consign all apparatus used for steam power to the "junk pile," and substitute modern gas and electric engines and motors. This change is based on the calculation that it will result in a saving of not less than 50 per cent. in the cost of power. Engines capable of producing about 1,250,000 H.P., propelled by gas, will have to be installed.

## GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 709.)

Business on the Stock Exchange last week had one or two interesting and strongly marked features; but they were almost entirely limited in their influence to the more speculative departments. In the choicer markets, the rise in the price of gold was a factor in the earlier portion of the week; and the still unlaid Coal Mines ghost was a nervous element. The week opened very quietly, and with no particular tendency. The gilt-edged division and Home Railways were only moderately good, but the Foreign Market was firm; and the closing of New York eliminated a possible centre of the disturbance. On Tuesday came a change for the worse, with a heavy fall in Americans. This, coupled with the sinister factors mentioned above, caused a general weakness. Consols fell $\frac{3}{16}$. Wednesday was very quiet, and rather dull and sensitive; but a favourable item was the lightness of the fortnightly account, which gave rise to no anxieties. The greatest weakness was in American and South African lines. Thursday was perhaps a little less inactive without much change in tone. Bad weather seriously depressed Railways. On Friday, the absorbing feature was a big jump in Americans (all turning upon the death of the Railway King Harriman); and this seemed to cheer things in general up a bit. On Saturday, there was not much doing; but Americans contrived to hold on to their advance pretty firmly. In the Money Market, the supply was just as abundant as it had been for many weeks past. Discount terms hardened in view of the rise in gold, but eased down again before the close. Business in the Gas Market was unusually active for the time of year, and prices were very firm. A considerable number of quotations made some nice advances; and none moved in the opposite direction. In Gaslight and Coke issues, the ordinary was quite brisk, and, with transactions ranging from 104¼ to 105, had a rise of half-a-point. The secured issues were little dealt in; the maximum marking 88, the preference 104¼ and 105, and the debenture 86¼ and 86½. South Metropolitan was also a little busier, and changed hands at from 119½ to 120½. The debenture made 85¼ and 86. In Commercials, the 4 per cent. was done at from 108 to 109 (a rise of 1), the 3½ per cent. at 104 and 104½, and the debenture at 81½. Among the Suburban and Provincial group, Brentford old marked 253 and 253½ (a rise of 1), Ilford "A" 142, ditto "B" 107 *cum div.* and 105⅝ *ex div.*, South Suburban preference 120½, ditto debenture 122½, Tottenham "B" 112, West Ham 124½, and ditto debenture 112½. The Continental companies were extremely quiet. Imperial marked 179⅜ and 180¼, ditto debenture 95½, Union from 95⅜ to 96, and European fully-paid 25. Among the undertakings of the remoter world, Bombay changed hands at $5\frac{13}{16}$, Buenos Ayres at from $13\frac{13}{16}$ to 14, ditto debenture at 95, Monte Video at 13 and 13⅛, Primitiva at from 7 to 7⅛, ditto preference at $5\frac{7}{16}$, River Plate at $16\frac{3}{4}$ to $16\frac{15}{16}$, San Paulo at 14½.

## ELECTRICITY SUPPLY MEMORANDA.

**Recognition of the Limitations of Electrical Heating—A Radical Change Required in Method—Proposals—Electricity for Cooking and Water Heating—The Relative Scope of Gas and Electricity for Improvement—Cost of Electrical Appliances—A Board and its Administration—More Poor Financial Returns.**

It will be remembered that a prescient writer attached to the staff of the "Electrician" predicted quite recently that cooking by gas is nearer to vanishing-point than most people imagine; but we find it very difficult to take such electrical prophets seriously. One day they are hilarious with joyful hope; another, deep in despondency. Time has just been spent reading a paper on "Electric Heating," by Mr. W. S. Hadaway, submitted to the American Institute of Electrical Engineers," together with the discussion thereon, as well as a comment by the "Electrician." The result of the perusal of this matter is an impression that our contemporary now makes a sort of hazy admission that all is not so well with electric heating as could be wished; that it and our electrical friends in America are persuaded that electricity, as an efficient and economical heating agent, has its limitations; and that the appliances are still far removed from ideal conditions. "In England," observes our contemporary, "we are wedded to the open fire; and the tendency has been, when electric heating is adopted, to simply replace this by radiators—*the results being by no means always what was desired.*" Exactly. That confirms our own trials and experiences, and corroborates statements in the "Memoranda" that have often been attacked and contradicted without sense or judgment. It is pitiful to see ascertained fact attacked by vain bluster and empty prediction.

Apart from experience, the paper and discussion assure us that there are restrictions to the effective use of electricity in maintaining an equable temperature in all but limited spaces during cold seasons, and that there must be a radical departure from the present designs of electrical appliances if there is to be a business cultivated in the heating of large spaces. As one speaker put it, if electrical heating is to be introduced upon the large scale into house warming, it will be necessary to accord to heating and ventilation more scientific attention than is now usually bestowed upon this class of work. In view of the concentrated character

of electrical heat, it was suggested that one way of utilizing it more effectually for warming purposes would be to employ an electric heater, and pass air over it for distribution throughout a house or other establishment as the case may be. Again, we venture to suggest that there are serious limitations to this mode of heating. To get the heated air well-distributed throughout a house would necessitate an expensive and a very well-designed conducting system; and the conditions the electrician has to meet to-day are not houses and other buildings with such a system incorporated in their structure, but houses and other buildings as they exist. Mr. Hadaway suggests the distribution of the exhaust steam from generating-stations for heating and general domestic use; and the adoption of electrical devices for other purposes in which concentrated heat is required. It is a pretty enough scheme on paper. But the cost of laying and maintaining a steam-distribution system throughout a town would stagger the most optimistic electrical engineer; and that, with the considerable heat losses, would make the scheme financially unworkable. On the whole, Mr. Hadaway is not very helpful in solving the problems connected with electrical heating; but two points are made abundantly clear by his review of the position and the discussion—that the field of economical electric heating is limited to devices in which the heat is usefully concentrated in a small area; and that, before any satisfactory progress can be made, there will have to be a complete change in the design of the appliances employed. In connection with the first point, Mr. Hadaway and one other speaker seemed to think that a more extensive and profitable use for electricity for heating will be found in the industrial, than in the domestic, field.

But there is not the same indication of any relinquishing of the ill-founded claim to the superiority of electricity for cooking purposes. In considering this matter, however, our electrical friends have an unconquerable difficulty in regard to the incomparable number of heat units purchasable for a given sum from gas and from electricity. The means of escape from this difficulty that has been adopted tickles one's risibility. It is assumed by our electrical friends that there is a loss of heat units when gas is employed to an extent not according with practice; and that there is a greater useful application of the heat units in an electric oven, which likewise does not accord with practice. They follow on with the assumption that the loss of heat units on the one side and the saving of heat units on the other about balances the two agents in the matter of cost. This is a simple argument that will not stand a practical test; but it may be specious and fanciful enough to arrest the attention of the householder. Mr. Hadaway was much more cautious than were some of the speakers on his paper. He said: "In modern apartment houses, electric lighting is available, but low heating efficiency is found in cooking, except in cases where gas is available. No one can question the value of gas as a fuel in cooking." And in another place he said: "A circular gas-burner will impart heat at a rate equivalent to 35 watts per superficial square inch. Electric stoves made for 110 volts will work at about one-third this rate."

Electricians usually seem to imagine that the ultimate efficiency of gas fires and cookers has been reached. The mistake may give passing but not lasting gratification. Generally speaking, we may claim that the gas cookers and the fires made by British manufacturers are in advance of those produced in America; and as between the thermal units available, for a given outlay, from gas and electricity, there is a large margin in favour of gas upon which to make further progress. Accepting 3412 B.Th.U. as equalling a unit of electricity at 1d.; and taking a net calorific power of 500 B.Th.U. per cubic foot of gas, at 2s. 6d. per 1000 cubic feet, 1d. will purchase 16,500 B.Th.U. From which is seen the possibilities—let alone what now actually exists—of gas as a heating agent, and the scope that remains for effective improvement. In the discussion on Mr. Hadaway's paper, Mr. Loewenthal stated that "in a gas-stove, the ventilating current required for the operation alone consumed at least 80 per cent. of the heat units obtained by burning the gas;" while "in the case of the electrical oven more than 90 per cent. of the heat energy could be utilized." We deny entirely the accuracy of the 80 per cent. requirement for ventilating current in the gas-stove. In the Leeds University tests with gas-fires, only about 30 per cent. of the heat generated in the stove used passed into the flue; and we should be curious to learn the reason why nearly three times this amount is required for a ventilating current in the case of a cooker. The fact is this is pure assumption on Mr. Loewenthal's part. But if we accept his figures—taking gas at the high price of 4s. and electricity at the low one of 2·5 c. per kilowatt-hour—it is seen that the operating costs, for the heat units usefully employed, will be practically identical; but then (according to him) 90 per cent. of the heat units of the electricity has been utilized, and only 20 per cent. of the heat units of the gas. The moral is that there is a big scope for improvement in the utilization of gas, and a precious small one in the case of electricity. As opposed to Mr. Loewenthal, the results of practical trials made with gas and electrical cookers by the Davis Gas-Stove Company, and reproduced in our columns on April 20 last (p. 166) and on May 4 (p. 296) may be quoted. The figures given in the latter place refer to the heating of water respectively by gas and electricity, in which figures it was shown that, in the competition for this purpose, electricity is entirely out of the running. It is admitted by all electricians who know what they are talking about and refrain from rash statements, that there is no present method by which water can be heated economically by electricity. Taking electricity at 2½d. per kilowatt-hour, said one speaker, in the discussion on Mr. Hadaway's paper, the cost of heating a gallon of water to boiling point, at an efficiency (say) of 80 per cent., is little more than 1d., which to many people is a prohibitive price, "as the same results can be accomplished with gas at very much less."

There is something else besides the low heating value of electricity that obstructs the progress of electrical cooking and heating—and that is the cost of the appliances. A writer in the "Electrical Times" has compiled a list, showing the reductions in the prices of electrical appliances that have taken place during the past two years—we suggest because there was little or no custom at the old figures. The prices cannot be called moderate in comparison with gas appliances. One maker offers a 3000-watt oven at £9; another, a 2400-watt one at £10; and a third, a 1500-watt one at £5 5s., which prices do not include fitting up and special wiring where a lower price than for lighting is charged for cooking. A four-lamp radiator (consuming a unit of electricity an hour) can be obtained now for £2 2s. A 2-pint tin kettle is purchasable at 10s.; a 1¾-pint copper kettle at 15s. 6d.; and a 1½-pint brass kettle at 18s. 6d. Another maker offers a 2-pint tin kettle at 7s. 6d.; and a copper one of similar capacity at £1 8s. 6d. A third charges 10s. and 18s. respectively. A 4-lb iron is on sale at 12s. 6d.; a 5-lb. one at 21s.; and an 8-lb. one at 23s. Several other appliances are mentioned; but their capacities are not stated. The supplier of these particulars says: "It should be borne in mind that it is not so much the cost of the electrical details which governs the list price, but the work put into the outer metal case, and the value of the metal itself. Owing no doubt to the class of demand in the past for electric heating apparatus, the material and finish have been maintained, perhaps, at an unnecessarily high standard." Not "unnecessarily." In the case of electric ovens, the metal and the casing must be maintained at a high standard, if there is not to be considerable heat loss by radiation, and that is a loss which, in the competition, electricity cannot afford.

Dealing in last week's issue with a number of municipal accounts, reference was made to the deficit on the working of the Stalybridge, Hyde, Mossley, and Dukinfield Tramways and Electricity Board. Attention has been called by an electrical contemporary to the fact that the generating costs of the Board eclipse all other records; being only 0·37d. per unit. Also that the average rate of charge by the Board is the lowest. But it is not pointed out how unfairly this low average rate of charge has worked on the gas undertakings of the local authorities and on that of the Hyde Gas Company, all of which are competitors and ratepayers; nor how hardly it has operated on the general body of ratepayers. This will be seen by extracting from the financial records the deficits on the working for the past five years—

| | Tramways Department. £ | Electricity Department. £ |
|---|---|---|
| 1905 . . . . . | 4,484 .. | 3,266 |
| 1906 . . . . . | 9,950 .. | 5,908 |
| 1907 . . . . . | 9,612 .. | 6,083 |
| 1908 . . . . . | 8,189 .. | 5,466 |
| 1909 . . . . . | 10,381 .. | 463 |
| | £42,616 .. | £21,186 |

From which it is seen that the enforced contributions of ratepayers to the support of the Board's undertakings have been no less than £63,802 in five years. The Board object to their affairs being criticized. One member of the Dukinfield Town Council the other day sought some information; and he was told that he might have got what he wanted without (as it were) setting the town on fire, and creating such an amount of curiosity as though there was something wrong being done. As spectators of what is going on, it seems to us there is something wrong that should be righted; and it is that the charges should be so rearranged that the ratepayers should not be called upon again to bolster up the Board and undertakings hitherto run on uncommercial lines, and that the thousands upon thousands of pounds wrongfully taken from the ratepayers in the past should be refunded. Only agitation will accomplish this in the case of a Board whose business principles do not comprehend the protection of ratepayers from an unjustifiable burden; and those who are courageous enough to start and maintain such an agitation until success is achieved would deserve well of their fellows.

While on this subject, the figures and other particulars published last week as to deficits and small net profits on municipal electricity accounts for the last financial year may be supplemented. In the case of Acton, the deficiency, after providing for the repayment of loans and interest, was £4943, compared with £2934 the previous year. But 70,597 units more were sold, though the total income was less by £118. This peculiar position is accounted for by, first, the fact that the public lighting by electricity has been discontinued, for which the ratepayers were mulct at the rate of 4d. per unit, and, secondly, that the power units sold have largely increased. These changes have reduced the average price per unit from 3·88d. to 3·33d., or 0·55d. per unit less over all the electricity sold. The effect of the loss of high-priced units, and the gain of low-priced ones, is well illustrated here; and this effect is showing itself among the undertakings throughout the country. Loughborough only obtained a balance on revenue account of £547, with the result that a grant of £1500 has had to be made from the rates, and an adverse balance of

£2346 has been carried forward. The Redditch undertaking also ended the year with a deficit of £2368. To the list of lean surpluses published last week, there has to be added Aberdeen with a net profit of only £227. It was stated last week that the net profit at Nelson figured at £36; but it may be added that the Manager of the department states, in connection with the metallic filament lamp, that a larger number of meters has had to be seen to than formerly, owing to the small amount of current used by the metallic filament lamps not always producing a true reading on the registration dial. Many other central station engineers, to their cost, know that their colleague's experience is not singular.

## ILLUMINATING ENGINEERING SOCIETY.

A CIRCULAR has been issued by the founders of the Illuminating Engineering Society—a Society formed for the study of the science and art of illumination—in which attention is called to the "influential support received from many distinguished authorities on matters of illumination in this country, on the Continent, and in America." The founders of the Society have spread their net far and wide with the view of securing the adhesion of men of position in the realm of illumination, and enrolling them as Vice-Presidents or as corresponding members. Although it is mentioned that the names of only a "few of those" who have expressed sympathy with the movement in this manner are given in the circular, it may be supposed that the list includes the names of the most renowned men who have accepted the offer of such honour as attaches to the printing of their names as Vice-Presidents. Of the twenty-three names published, seventeen are those of gentlemen abroad; and only six are of Britishers—among the latter, the only name identified with gas lighting being that of Professor Vivian B. Lewes. The six Britishers are: Sir William Crookes, Sir William Preece, Sir Boverton Redwood, Sir H. Trueman Wood, and Professors J. A. Fleming and Vivian Lewes. Among the names from abroad that are well known to, and esteemed by, our readers are: Professor H. Bunte, M. Sainte-Claire Deville, Professor H. Drehschmidt, Dr. A. H. Elliott, Dr. E. Schilling, and Professor H. Strache. Professor Sylvanus P. Thompson, D.Sc., F.R.S., has consented to become the first President; and, it is stated, "a very representative Council has now been formed." The active work of the Society commences in November.

### Our Street Lamps.

There is reproduced under this heading, in the "Builder," the following paragraph which appeared in their issue of Sept. 10, 1859: "Things constantly before our eyes become so familiar that we are liable to pass them by without any particular attention, although, if persons of educated taste had some of these objects put before them for the first time, they would be surprised at their deformity, and wonder how such things could have been so long tolerated. Among the most conspicuous objects in the streets of the Metropolis are the thousands of lamp-posts which line the highways, and are distinctly in view during both night and day. A glance at one of these, which may be taken as a type of the majority, shows that it has been constructed without attention to any principle of design. It is neither beautiful in form nor symmetrical in its proportions. It is a matter which might have been planned, as no doubt it was, by some ordinary mechanic, who had no knowledge of, or feeling for, art. Yet, for more than half-a-century, since gas put out oil, the same form, with scarcely a shade of change, has continued to be manufactured in thousands, not only for the use of the Metropolis, but also for the provincial towns; the same description of lamp is reared on the same pattern of pole in remote villages, in the railway stations, and in British possessions abroad. The shape of the street-lamp is as strictly adhered to as if it were a matter of caste in India. In connection with our public buildings, where the skill of the architect has been called in to devise the form of the gas-lamps, the improvement has been great. The chief lights at Buckingham Palace have a handsome appearance, so have those within the railing of the British Museum; and at the Houses of Parliament the lamps are of artistic design, and in harmony with the architecture. Some say, 'What can you do with a lamp-post?' An inspection of some of those to which we have referred will of itself show that elegance can be imparted to what are generally considered matter-of-fact objects."

The twenty-eighth annual convention of the New England Water-Works Association was held at the Park Avenue Hotel, New York, from Wednesday to Friday of last week, when the opportunity was afforded members to visit the Ashokan dam and other important water-works undertakings. In connection with the convention, the associate members had an exhibition of water-works supplies.

At a meeting of the Dublin City Council, Alderman Reigh proposed the adoption of a vote of sympathy with the family of the late Mr. Thomas Cotton, Gas Inspector under the Corporation. The Alderman stated that Mr. Cotton was an able, efficient, and conscientious officer. He was born and educated in Dublin, and had been a good citizen. The Corporation had lost by his death one of their best officers. The motion was passed.

## TRADES UNION CONGRESS.

### Meeting at Ipswich.

THERE was much doing at Ipswich last week; for it was in this town that the Trades Unionists had decided to hold their forty-second annual congress, and there they duly gathered to the number of 497. A busy time had been anticipated; and this expectation proved to be fully justified. In fact, there never is any lack of discussion at these meetings, though it must be admitted that generally not all of it is of a strictly practical nature. This may be once more said of last week's congress, which in many respects was extremely like its predecessors. Similarity, however, is no more than can fairly be expected, seeing that to a large extent the problems which confront, and the ambitions which assail, the Labour leaders must remain the same. Not while the world and human nature remain as at present, are the one likely to be entirely settled or the other to be completely satisfied. There are limits to what can be accomplished even by organized Labour; and the more the delegates to the congresses kept within those limits, the greater would be likely to be the good resulting from their efforts. But the question would doubtless arise as to just what the limits were; and here at once there would be disagreement, for the Trades Unionists have certainly an altogether more extensive belief in their own powers than is shared by their critics. Thus there seems nothing for it but to go on as at present—considering annually a number of resolutions, some of which may bear good fruit, but more of which might as well never have seen the light of day for all the practical results that can come of them. Six days of last week were occupied by the delegates in their business; the meeting breaking up on Saturday. The first thing to be done on the Monday morning was to welcome the members of the congress to Ipswich; and this was undertaken by the Mayor (Mr. F. C. Ward) in an excellently worded speech—concluding with the hope that the labours of the delegates might be for the good of those they represented and all classes, for the furtherance of industrial peace and prosperity, and for the welfare of this country and the Empire at large. The work of welcome was also shared in by the Borough Members—Sir Daniel F. Goddard and Mr. Felix Cobbold—and thereafter the business was taken in hand.

The opening item, of course, was the Presidential Address of Mr. David Shackleton, M.P., who occupied the chair. In the statistics which he was able to quote, it was pardonable that both he and his hearers should have felt satisfaction. The last meeting of the congress held in the Eastern Counties was at Norwich in the year 1894; and there were present 372 delegates, representing Trades Unions with a membership of 1,035,000. On the present occasion, the 497 delegates represented Unions with a membership of 1,701,000, and included 33 Members of Parliament, 26 Justices of the Peace, 2 Mayors, 6 Aldermen, and 18 Councillors. To-day Trades Unionism and Labour has no fewer than 53 representatives on the floor of the House of Commons, voicing the aspirations and desires of organized Labour. In the opinion of the President—and many people will agree with him—no Act of Parliament has given greater satisfaction, brightened more homes, and gladdened more hearts than that which bestows old-age pensions on the poor. It was not the desirability of the Act, but the cost of carrying into effect its provisions, that was the chief subject of criticism before it passed into law; but increased outlay does not trouble the Labour representatives one little bit. The cost can be so easily met, according to their theory; all that is necessary being to make the landlords pay their "fair share" of taxation. However, good as the Old-Age Pension Act is, Mr. Shackleton sees one blot upon it—the bar of Poor Law relief. The removal of this disqualification is to be earnestly sought. It will, of course, add still further to the cost of the Act; but the President perceives "in the Budget the possibility of further revenue." Evidently he is a long-sighted man. Some credit is taken in the address for the fact that a Bill for dealing with the evils of sweating on lines which have from time to time been advocated by the congresses has been passed into law by the action of the Government. This is the Trade Boards Act, which provides for an impartial court, where both employer and employed can be heard. So far, the measure is merely regarded as an experiment, and thus its operation is confined to a few trades. There is foreshadowed in the address the probability of the question of insurance against unemployment forming part of the work of the next session of Parliament; but this is entering into the realm of speculation. Of more immediate interest are Mr. Shackleton's remarks on the desire for higher education among working men. These were as follows: "It has been my privilege for nearly two years to work on what is known as the Joint Committee of Oxford and Working Men. It has been a source of considerable pleasure to have had most enthusiastic support from the University men at Oxford in bringing into being what are known as tutorial classes. Our first year's work was confined to two centres—Rochdale and Swindon. The character of the papers sent into the examiners was of the highest order; some of them being considered equal to the best work done at Oxford. Our last session was conducted on a more extensive scale; and I am pleased to say the results of the examinations were exceedingly satisfactory. We commend these classes to the generous consideration of all local Education Authorities, and Trade Unions, Friendly Societies, and Co-operative Societies. The advantages of the system are close personal touch between teacher and student, full opportunity of question and

answer after each lecture, and, above all, the opportunity of bringing a large number of young men and women under the best tuition, and on those subjects which the class decides shall form part of their curriculum. We hope before long to have classes in every centre of industry; and from among the present students many capable and efficient teachers will arise. From these young men, will come the future leaders of the Trade Union and Labour movement. They will come not only with the practical experience of the factory and workshop, but with a sound theoretical knowledge of the social, economic, and industrial history of the national and local affairs of their country, which will more fully equip them for the ever-increasing duties and responsibilities which an active life among the workers of this country demands."

The Parliamentary Committee's report—always a bulky portion of the matter submitted to the consideration of these congresses—on the present occasion took the form of a pamphlet occupying no less than 56 closely printed pages; and the very first paragraphs contained a statement that is greatly open to question. This was to the effect that the Mines Eight-Hours Act had in some parts of the country caused a good deal of friction which was happily now settled. From this one might be led to suppose that friction is at an end; whereas in reality a most disturbed condition of affairs still exists. A resolution having been moved in Parliament by a Labour Member altering the fair wages clause in Government contracts, the Government submitted a clause of their own, which was ultimately accepted. As a guide to local authorities and others who have not yet such a Trade Unionist clause in operation, but still may be desirous of inserting one in their contracts, the Government conditions may perhaps be here reproduced: "The contractor shall, under the penalty of a fine or otherwise, pay rates of wages and observe hours of labour not less favourable than those commonly recognized by employers and Trade Societies (or, in the absence of such recognized wages and hours, those which in practice prevail among good employers) in the trade in the district where the work is carried out. Where there are no such wages and hours recognized or prevailing in the district, those recognized or prevailing in the nearest district in which the general industrial circumstances are similar shall be adopted. Further, the conditions of employment generally accepted in the district in the trade concerned shall be taken into account in considering how far the terms of the fair wages clause are being observed. The contractor shall be prohibited from transferring or assigning, directly or indirectly, to any person or persons whatever, any portion of his contract without the written permission of the department. Sub-letting, other than that which may be customary in the trade concerned, shall be prohibited. The contractor shall be responsible for the observance of the fair wages clauses by the sub-contractor." Many other matters were dealt with by the Parliamentary Committee in their report. In fact, they themselves remarked that it might be claimed that during no previous period in the history of the movement had the work to be transacted by the Committee been of a more varied or interesting character than during the past year. To all these other questions, however, we have no space or particular inclination here to refer.

The second day's proceedings consisted largely of a violent attack on Mr. Richard Bell, M.P., who enjoyed a short but no doubt sweet period of notoriety some time ago when a general strike of railway employees was threatened. A resolution was proposed condemning Mr. Bell not only for having failed to support his colleagues during a debate in the House, but for making a speech "which assisted the North-Eastern Railway Company in their attempt to arrogate to themselves the privilege of deciding which of their employees should be allowed to belong to a Trades Union," and instructing the Parliamentary Committee not to endorse the candidature of Mr. Bell at any future election, and calling on all Trades Unionists to decline to give him their support. Mr. Bell offered an explanation, expressed regret again and again, and admitted that he had been indiscreet; but the mover could not be prevailed upon to withdraw his resolution. A way out of the difficulty was, however, eventually found; an amendment that the apology be accepted being carried by an overwhelming majority. Mr. Bell thus escapes the ostracism which the adoption of the resolution would have thrust upon him; but the extent of the "moral damage" which he has in consequence suffered has yet to be seen.

The Salvation Army having been condemned for sweating and underselling in connection with a joinery works, members settled down to consider a motion dealing with another sort of army—the Territorials. The resolution expressed emphatic condemnation of any indirect or direct compulsory enlistment of the working classes into the Territorial forces, and also condemned the regulations which permitted these forces to be used in suppressing trade disputes. Further, it asserted that, as militarism and the existence of standing armies constituted a menace to popular liberty, a citizen army free from military law in times of peace was the best alternative to the class-biassed policy of the present Government. The resolution was not altogether clear in its terms; but the idea of its author was that the Territorial Army scheme was playing deliberately into the hands of the Conscriptionists. He ridiculed the idea that the Army was a voluntary one, and said that what was wanted was a citizen army free from military control. The delegates seemed to be men of peace indeed; for they did not want even "a citizen army free from military law in times of peace." The second clause of the motion was deleted, and the remainder was adopted *nem. con.* Judging from some of the speeches made, the Trades Union Congress are of opinion that peace can best be assured by depriving oneself of all means of defence; but fortunately for the Empire, this view is not as yet universally held here.

Once more the congress have "called upon the Government to appoint a Minister of Labour, with full Cabinet rank;" and they have expressed disagreement with the importation and exportation of blacklegs during disputes. The delegates also concurred (though only by a small majority) in a suggestion that the Government should be urged to amend the Workmen's Compensation Act so as to make it definite who are the dependants in any case of loss of life, and to make the liability equal in the case of single and married men. No system of Labour Exchanges will be satisfactory to the congress unless Boards of Administration are composed equally of representatives of recognized Trade Unions and employers, with a neutral Chairman appointed by the Board of Trade; unless provision be made to prevent the Exchanges being used to undermine Trades Union rates and conditions of working by supplying labour at less than the Union rate; and unless it is provided that under no circumstances shall the Exchanges be used as agencies for the supply of labour to assist any firm who may have a dispute with their workpeople. The next resolution urged upon the Labour Members in the House of Commons to take up at once the question of the eviction of workmen and their families from their homes during trade disputes, and do everything in their power to get the Government to pass into law a measure that would "put an end to this cruel and inhuman method of warfare." By way of a change, the delegates declined to pass a motion suggesting that the time had arrived when the Government should consider the propriety of making grants-in-aid to trade organizations supporting their members during periods of slackness by the payment of out-of-work benefit. The opposition to this proposal was based upon the ground that, if carried into effect, it would sap the independence of the Trades Unions. A better reception naturally met a resolution that the old-age pension should be available at 60 years, instead of 70, together with the removal of all disqualifications. The almost unanimous vote in favour of a motion in support of the land clauses of the Finance Bill was preceded by the following unkind remark from a delegate: "You'll pass this resolution because there is no limit to the stupidity of a Trades Union Congress." The eight-hour day met with the usual support; but the delegates firmly declined to be "of the opinion that the time has arrived for conferring compulsory powers on the Board of Trade to inquire into any industrial disputes when requested by either party—pending such inquiry and report, no strike or lock-out to take place." The members did not appreciate the idea of thus taking away the power of the Union to strike the employer at the time that seemed to them most suitable. The idea of a minimum wage was approved.

The delegates separated, after having decided to meet next year in Sheffield. When that time arrives, there will no doubt still be plenty left to discuss; for the Government are hardly likely meanwhile to have carried into effect the very generous programme set out for them at this year's congress.

## Classes in Gas Engineering and Supply.

From a proof-sheet of the "Co-Partnership Journal" which we have received from the Editor, Mr. W. T. Layton, we are able to give the following full information with regard to classes in gas supply, &c., for the session 1909-10, in connection with the City and Guilds of London Institute, Polytechnic, Regent Street, W. Classes in Gas Engineering and Manufacture, Tuesday and Wednesday evenings: Ordinary (Wednesday), 7 to 8.30; Honours (Tuesday), 7 to 8.30. Teacher, Mr. R. H. Collins, Assoc. M.Inst.C.E. Fee for session, 10s. 6d. Goldsmiths' College (University of London), New Cross, S.E.: Classes in Gas Distribution, Thursday evening: Ordinary, 7.30 to 8.45; Honours, 8.45 to 10. Teacher, Mr. T. Holgate, M.Inst.C.E., F.C.S. Fee, 7s. 6d. Woolwich Polytechnic, Market Street, S.E.: Classes in Gas Engineering and Supply, Monday evening: Gas Engineering, 7.25 to 8.25: Gas Supply, 8.30 to 9.30. Teacher, Mr. Holgate. Fee—one subject, 7s. 6d. (including Chemistry and Mathematics); both subjects, 12s. 6d. Battersea Polytechnic, Battersea Park Road, S.W.: Classes in Gas-Fitting, Monday, Thursday, and Friday evenings, 7.15 to 9.45. Teacher, Mr. H. A. Wall. Fee, 10s. Westminster Technical Institute (L.C.C.), Vincent Square, S.W.: Classes in Gas Supply, Monday and Tuesday evenings, 7.15 to 9.30: Monday, Ordinary; Tuesday, Honours. Teachers in the Ordinary Grade, Mr. P. Smithers and Mr. H. Rothwell. The instructor in the Honours Grade has not so far been appointed. Fee, 10s. Tottenham Polytechnic, South Tottenham: Class in Gas Supply, Friday evening. Teacher, Mr. Holgate.

The "Journal für Gasbeleuchtung" reports the death on the 11th ult. of Herr Julius Jürgens, who had since the year 1885 been Manager of the gas and water works at Einbeck.

At a meeting of the Executive of the East Aberdeenshire Liberal Association held on Saturday it was agreed unanimously to recommend that Mr. W. H. Cowan, M.P., should be the Liberal candidate at the next election. Mr. Cowan, who was present and addressed the meeting, represents the Guildford Division of Surrey in the present Parliament.

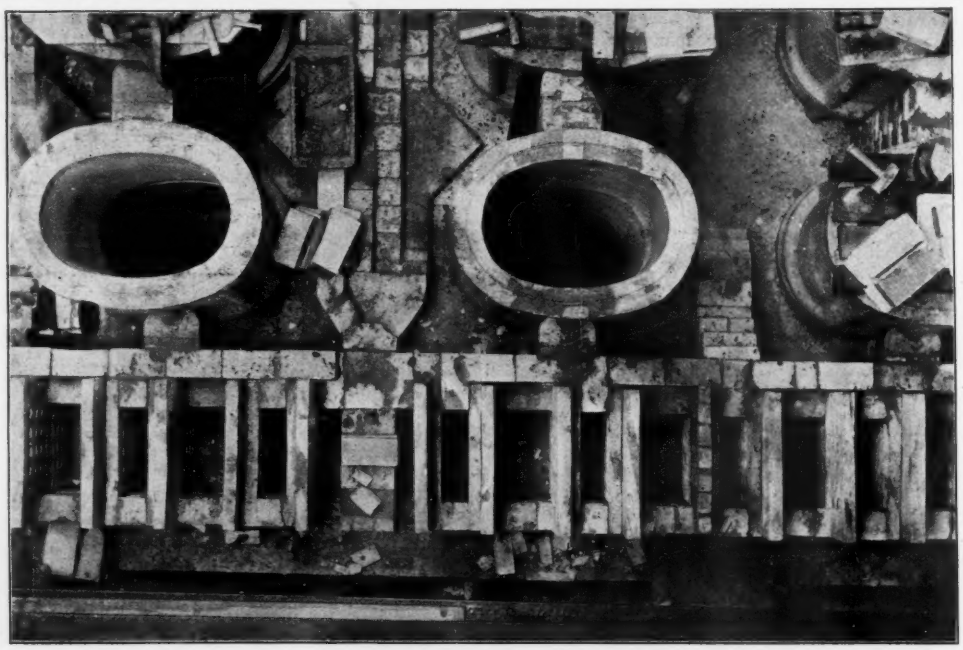
# THE WOODALL-DUCKHAM VERTICAL RETORTS AT KENSAL GREEN.

### A Forty-Retort Installation.

At the Kensal Green works of the Gaslight and Coke Company, the largest installation on the Woodall-Duckham continuous vertical retort system yet erected is now nearing completion; and the settings will be ready to commence the production of gas by the middle of November. Very shortly afterwards, the installation of settings now being constructed for the Burnley Corporation will be commencing manufacturing operations; and this will only be short of the size of the Kensal Green installation by a single setting of four retorts. But this week attention is confined to the Kensal Green plant, which is the result of the excellent experience with the comparatively small trial installation that has been in operation now for some time at the Nine Elms station of the Gaslight Company, and the working of which has been keenly followed by the Company's Chief Engineer (Mr. T. Goulden) and the Works Engineer (Mr. T. S. Lacey). There need be no stronger testimony of the views formed, by direct experience, by Mr. Goulden as to the Woodall-Duckham automatic system of continuous carbonization than this larger installation of ten settings of four vertical retorts, which it was our pleasure to inspect in their nearly complete stages last week. If any finishing touch be required to the evidence already accumulated as to the successful working of the system, this Kensal Green installation will give it; for the auxiliary plant allocated to the new producing plant will represent in effect a complete gas-works from carbonization to metering and storage. In this way, there will be no loophole for inaccuracy; and the scope for definite and reliable tests will be as broad and wide as it is possible for it to be. And of this we may rest assured, that the Works Engineer (Mr. A. S. Baker) will not leave a stone unturned to find the full worth of the system from the plant that it is his privilege to have placed under his charge.

#### Roof Alterations.

The new plant occupies a part of one of the old retort-houses at the station. The only alteration to the house that was needed for the benches was to the roof, a portion of which is carried by the buckstays of the new settings. Partly to this roof alteration is due the arrangement of this first installation of vertical retorts in two lines—that is to say, five settings in each row—as the scheme for carrying a part of the roof off the buckstays could not have been effected had the settings been constructed in a single line; and it is naturally the desire of the Company's advisers to, even in the larger installations, proceed tentatively. The walls of the house have not had to be raised at all; and the roof itself, or rather the ridge of the roof, is very little higher than it was before—indeed, practically all that has been done is to make more room between the principals. Not much work was occasioned by this.



**Plan on Section Length of Woodall-Duckham Settings at Kensal Green.**

The old roof was stripped; and the new arrangement of roof sets on the same bed-plates as before.

#### The Settings and the Ground Space Occupied.

The retort-house is 65 feet wide; and the part of the ground now occupied by the Woodall-Duckham settings had previously upon it a central bench of five settings of nine horizontal retorts. The same ground space is now tenanted by the ten settings of four retorts, arranged in two parallel blocks of five settings, with a central space of 9 feet between them; and there is still a good margin of working room round the settings. So that, with the new compared with the old, the economy of space is considerable. As a matter of fact, the producing capacity of the ten vertical settings will be 1,250,000 cubic feet of gas a day, which is double that of the settings displaced. The point need not be laboured to show its importance where a site is circumscribed, and there is no spare room for extensions on the old system.

The length of each bench of five settings is 55 feet. The settings are 10 feet centres; and the depth from front to back between the buckstays is 17 ft. 6 in. The whole of the settings and the producers are carried 9 feet above ground level (at Nine Elms the latter are at ground-level) on a bed formed of 14-in. by 6-in. rolled steel joists, with concrete filling. The buckstays not only serve as binders to the settings and producers, but they also carry the coal-hoppers, conveyors, and roof. The whole of the upright and girder work is of substantial character. The height from ground level to the top of the retorts is 35 feet, and from that point to the top of the coal-hoppers 12 feet; so that the over-all height (including the 9 feet clear below the settings for the discharging operations) is 47 feet.

The forty retorts comprising the installation are 25 feet long, and 21 in. by 9 in. at the top, expanding to 29 in. by 20 in. at the bottom. The combustion chambers are situated round the top 5 feet length of the retorts; and access to each chamber is obtained by manholes in the front of each. The gases descend from there to the bottom of the settings—the hottest part of the retort being at the top where the coal enters, and the temperature declining to the bottom of the retort. As previously mentioned, the producer is raised above the ground-level; and the back wall of the producer now forms one of the side walls of the setting. The regenerator is located in the wall on the reverse side of the settings. Each bed has a separate generator and chimney; the latter being rectangular in section to within a few feet of the roof, and then continued through the latter by a circular extension. The regulation of the heat to the settings is accomplished by dampers on the hot secondary air and primary gases just before they meet at the nostrils. There are four sets of nostrils situated just below the combustion chamber level; and the gases are mixed in a chamber just before reaching the retorts. The regulation of the heats with these settings is an extremely simple matter; and it has not been found that the temperatures vary, or that they require special watching.

#### Coke Extraction.

As is well known, in the Woodall-Duckham system the whole of the coke discharging is accomplished mechanically; and as upon the speed of discharge depends the rate of travel of the coal through the retort, we will briefly refer to the coke-extracting part of the setting before dealing with the charging device. The principles of the apparatus for the extraction of the coke are the same

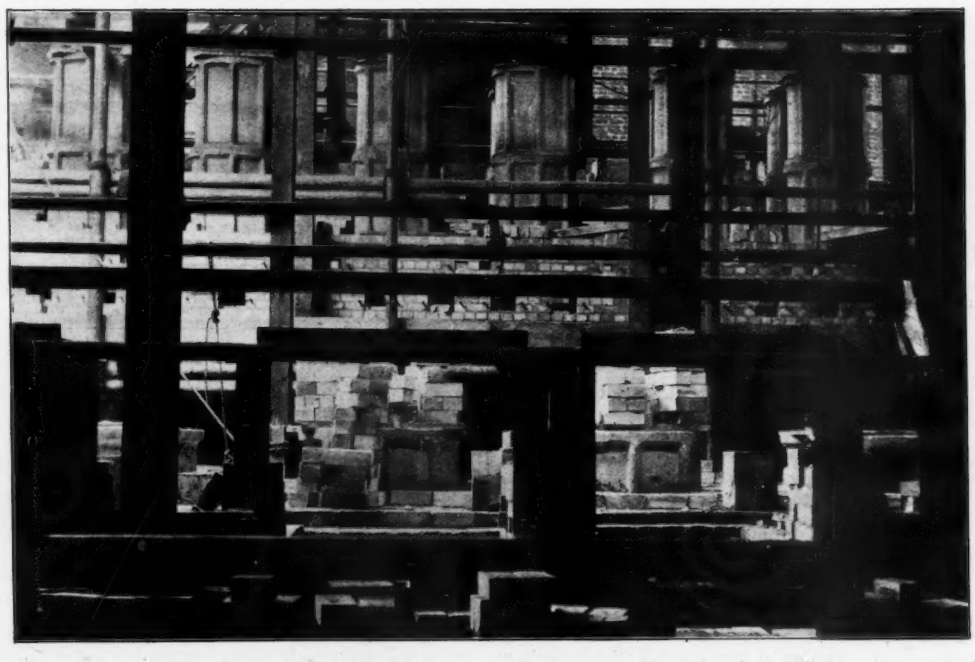
**Elevation of Bottom Length of the Kensal Green Settings.**

as are incorporated in the plant at Nine Elms; but an improvement has been effected, in that the discharging apparatus is perfectly gas-tight, and is more readily accessible for cleaning purposes. Running generally over the coke-extracting apparatus. At the bottom of each retort (and each retort by the way is a separate entity from the feed to the discharge) is a cast-iron hopper with one side sloping, which side takes the weight of the charge in the retort. At the bottom of the slope is fixed a wheel with helical blades, which, as it revolves, discharges the coke in small quantities from the retort into the hopper beneath. This hopper is in the form of a faced drum, which receives the coke, and in its turn automatically discharges it into barrows or conveyors. The speed of the extractor is 1·2 revolutions per hour; while the discharging drum makes 5 revolutions an hour. The extractor speed is variable at will; and the speed to which it is set governs the rate of carbonization. There is one point upon which there appears to be some little doubt in the gas profession, and that is as to the power required to operate the extractor-roll. There need be no question regarding this. The pressure of the coke on the extractor is, indeed, so small that it can be easily operated by hand, as well as by any machine. Standing under the retorts, it is interesting to see the four lines of ten coke-hoppers, with their discharging-drums. They are strongly built; the drums fit true; and, wherever one looks, it is noticed that strict observance of the correctness of every detail has been a feature of the erection.

The installation includes a gas-driven electricity generating plant; and each block of settings will have its own 6-horse power electric motor for driving purposes. A shaft is supported by brackets on the main uprights; and to this the extractors and discharging-rolls are connected by gearing.

### Accessibility.

Proceeding from the ground level, it must be said, in passing, that we like the ample and safe provision made for reaching all parts of the settings. Strong stairways, with chequer-plate treads, lead from platform to platform. The first reaches to the clinkering platform at the 9 feet level (with the outer side railed in) for the two blocks of settings. The platforms are also floored with chequer-plates. On the producer sides, hinged doors are provided in the platform (in range with the clinkering-doors), through which the clinker can be deposited direct into trucks at the ground



**General Elevation of the Kensal Green Settings.**

**General View of the Two Blocks of Settings under Construction.**

level. From this platform a second stairway leads to the producer-charging floor; and a third similar stairway carries one up to the retort-feeding floor.

### The Coal-Feeding Arrangements.

On the top of the benches little is found that is different from what has been previously described in connection with the system, and the smaller installations of the plant. The retorts are finished with cast-iron mouthpieces, to which are attached the rotary drum feeding devices and the gas take-offs. The feed of the coal, as explained earlier, is entirely controlled by the extraction of the coke; and the speed of the feeding-rolls is so regulated that they always contain some 50 per cent. excess of coal beyond requirement—that is to say, they really run just twice too fast. A ratchet drive operates the feeding devices—the power being supplied by the electrical plant referred to when dealing with the coke extracting arrangements. The top feeding devices and the bottom discharging drum being mechanically actuated, makes the process completely automatic. Before leaving these features, it may be added that a continuous foul main runs down each side of each setting; and connections with a screw-down valve are made to these from each retort.

Above the retorts are the coal-hoppers, to carry sixteen hours' supply. Shoots from these hoppers direct the coal to the feeding arrangements. The coal is raised to the hoppers by a bucket elevator (with breaker at the foot) situated at one end of each block of settings; and it is distributed to the hoppers by push-plate conveyors running between them (there being two hoppers to each bed), so there is one conveyor to each block of five settings. The plant is all so designed that it will deal with a second series of ten settings, for which room has been left at the end of the house. These two blocks of retorts—40 in all—have a guaranteed minimum carbonizing capacity of 2¼ tons of coal per retort per day, or in the total 100 tons; but the figures from actual working that have been published from time to time in our columns show that this minimum guarantee is materially exceeded. And in regard to labour, when coke-conveyors are introduced, three men per eight-hour shift will be sufficient to deal with the installation, producing about 1,250,000 cubic feet of gas per day. This surely will bring carbonizing wages down to somewhere about the irreducible minimum.

There is not a great deal more work to do in connection with the installation, which will in a few weeks be in operation—in fact, before many days are over part of the settings will be under slow fire. Looking at the structure superficially, there is all the evidence about it that it has been carried out with an eye to efficiency, durability, and smooth automatic operation. From an installation on such a scale, we shall look for results that will in every way be confirmatory of those published in respect of the working of smaller installations.

## CONCRETE BUILDING ENCLOSING A GASHOLDER.

A reinforced concrete building has recently been constructed for the Municipal Gas-Works at Reick, near Dresden, for the purpose of enclosing a gasholder of 3,884,650 cubic feet capacity.

The structure (according to "Engineering Record") consists of a circular container and an enclosing wall, both of reinforced concrete, and a domed roof and lantern having a steel frame, and rising to a height of 246 feet above the foundation. The container is constructed for a depth of water of 32 ft. 10 in.; and it serves also as the foundation for the enclosing wall. A double layer of asphalted felt was first laid, followed by a reinforced concrete slab, 3 ft. 3 in. thick. At its upper part, the container wall is only 2 feet thick. As the wall was raised, the back was tarred; the inner surface being finished with cement mortar.

The enclosing wall consists of (1) a plinth 24 ft. 11 in. high and 2 ft. 5 in. thick, (2) the main wall, 78 ft. 2 in. high and 8 in. thick, and (3) an upper wing and cornice, 30 ft. 4 in. high. Five horizontal galleries, carried on corbels, aid in stiffening the structure. The cornice is hollow; the top being covered by reinforced concrete slabs. Five towers with internal staircases are added, chiefly for architectural reasons, to break up the surface. They were erected after (and independently of) the wall, and are not rigidly connected with it, as it was feared that such a construction would cause cracking during changes in temperature. The external surfaces were treated so as to give the effect of stone.

The dome consists of a number of steel trusses, each lying in a meridian plane and intersecting at the centre. A stiff steel ring, forming the base of the dome, is built into the cornice; and vertical angle irons are riveted to it, in order to distribute wind stresses over as large an area of wall as possible. The lantern is of steel, filled in with reinforced concrete panels.

When the building was completed, a slab was constructed to serve as a floor within the ring by first placing a layer of concrete 12 inches thick in 23 feet squares, and then covering these squares with a layer of concrete 1$\frac{9}{16}$ inches thick, reinforced with rods. Over the whole surface, a water-tight lining was laid.

**Gas-Engine Silencers and Explosions.**—It is remarked by the "Engineer" that the possibility of gas-engine silencers causing an explosion probably does not suggest itself to owners of gas-engines; but the risk is one that cannot be ignored, and several failures of this kind have been experienced. Such a failure in connection with a 1000 H.P. gas-engine, recorded in the annual report of the Inspector of Factories, which led to fatal consequences, may be noted by those interested as a warning of the possibilities that exist in this direction. It should be remembered that unconsumed gas may at any time be discharged into the silencer through misfires, and that the hot gases of the next discharge may ignite them, causing an explosion which the outlet-pipe cannot release in time to prevent dangerous pressure. It would thus seem that safety lies only in making the silencer strong enough to stand the explosion, or in providing relief-valves which will act quickly enough to prevent accident.

# A NEW HOLDER AT ARBROATH.

### Inauguration Ceremony.

As has been mentioned in the "JOURNAL" from time to time, considerable reconstruction and extension of the Arbroath Corporation Gas-Works has been effected in recent years. The latest accomplished work has been the erection of a new gasholder, the inauguration of which took place last Thursday—the ceremony being also held to be a celebration of the successful completion of the other works. The gasholder, which is in a steel tank entirely above ground, was erected by Messrs. R. Dempster and Sons, Limited, of Elland; the concrete foundation and connections having been put in by the Corporation workmen, under the direction of Mr. A. C. Young, the Gas Manager. The tank is 101 ft. 6 in. in diameter, and 26 ft. 6 in. deep. There are two lifts to the holder—the outer, 100 feet diameter and 26 feet deep; and the inner, 97 ft. 6 in. diameter and 26 feet deep. The capacity of the holder is 400,000 cubic feet. The storage of the works has hitherto been only 300,000 cubic feet, provided by two holders—one of 200,000, and the other of 100,000 cubic feet. The new holder therefore raises the storage to 700,000 cubic feet. There is no need to describe the other alterations which have been effected, as they are sufficiently referred to in the remarks by Provost Alexander and Mr. Young.

For the inauguration ceremony, the members of the Town Council, and neighbouring gas managers, accompanied by their lady friends, assembled at the works.

Provost ALEXANDER, opening the proceedings, said that when first electricity came to be a thing which was adopted for lighting, owners of gas-works got a little alarmed. They thought that if this new illuminant continued to gain the approval of the inhabitants of the country, their occupation, as producers of gas, would be gone. But he was glad to say that, like many another thing in this world, electricity had been a blessing in disguise, because gas engineers and managers recognized their responsibilities. They were a body of highly trained and competent men. They set their wits to work; and they had succeeded in introducing new methods of producing gas, which had been entirely successful—the gas being made at very much less cost. In addition, the methods in which gas was now used as an illuminant, put it, he was going to say, on an equal platform with electricity; but he would now say that it left electricity far behind. Of course, gas and electricity each had a field in which it could be used economically. Electricity, so far as he could make out, was very suitable for power. Gas, on the other hand, even though the bulk of the householders in Arbroath were to introduce electricity, would still have a large field of use for heating, cooking, and other things. When some of the electric companies applied for a Provisional Order for Arbroath, the Gas Commissioners, like others, were somewhat alarmed; and they did all in their power to stave off the evil day. Of course, they could not do this. They now had an up-to-date Company, who started supplying electricity, both for power and light, last year. He was told that the Company were highly satisfied with the result of their first year's working. Speaking as a Gas Commissioner, he might say they were very highly pleased with their last year's working. Every year, for a number of years back, they had had large increases; and though last year the increase was not, perhaps, quite up to the average of previous years, still, if they took into consideration that they had to meet a new competitor, and the state of trade, he thought the Town Council and their Manager had reason to congratulate themselves. Since Mr. Young took charge of the works, the whole manufacturing plant had been renewed, at a very large cost; and when he told them that all this expenditure had been incurred without adding a penny to the capital account, it said a very great deal for Mr. Young and his able Convener, Bailie Smith. For two or three years Mr. Young had been pressing on the Commissioners the necessity for providing more holder accommodation. They, seeing that they had spent a large amount of money, wished to postpone the work as long as they possibly could; but at the end of last year Mr. Young decidedly gave them warning that, if anything occurred during the coming winter, he would not be held responsible. They knew Mr. Young was a safe guide; and they took his advice. They appointed a Sub-Committee to visit certain towns; and after a good deal of information had been obtained in this way, the Sub-Committee strongly recommended the Town Council, in building their new holder, to adopt the type they had. Mr. Young, of course, had been the Engineer of it. The holder had been built to his design in every detail; and he might say, in passing, that the reconstruction of the works, from the retorts upwards, had all been carried out to plans by Mr. Young, and under his supervision, and that a good deal of the work had been erected by his men directly. They were met for the purpose of inaugurating the holder; and it had been thought that the right thing to do was to ask the wife of the Convener to perform the ceremony. He had great pleasure in asking Mrs. Smith to turn the wheel which would open the valve and allow the gas to pass from the holder into the town main.

This was done by Mrs. Smith, under the guidance of Mr. Young.

Provost ALEXANDER then said Mr. Young had informed him that he was thoroughly satisfied with the work the Contractors had turned out. As their representative, Mr. King, was present, he would ask him to say a few words.

Mr. E. J. KING said this was a red-letter day in the annals of the Corporation Gas-Works. When he told them that it was twenty-five years since the last gasholder inauguration took place there, they would agree with him that it was a rather important day. Bailie Smith, the Convener, had actively interested himself in the holder, as he had in the work of the gas-works during the past three years; and they, as Contractors, thought that this was a fitting opportunity to present Mrs. Smith with a little memento of the occasion. [The presentation took the form of a silver rose bowl, with ebony stand.]

Bailie SMITH, on behalf of his wife, returned thanks for the gift.

The company were then photographed, and opportunity was taken to inspect the new holder; a goodly number of the visitors ascending to the gangway round the top of the tank. Thereafter luncheon was served to about a hundred ladies and gentlemen in a tent on the ground—Provost Alexander presiding. The Chairman intimated that they had apologies for absence from Mr. W. Doig Gibb, the Chief Engineer to the Newcastle and Gateshead Gas Company, who had only recently obtained what was considered the blue ribbon of the gas industry, by being appointed Engineer of the South Metropolitan Gas Company, of London; Mr. Thomas Wilson, of Coatbridge; Mr. Alex. Waddell, of Dunfermline; Mr. S. Milne, of Aberdeen; and others.

Mr. A. YUILL, of Dundee, proposed the toast of "The Town and Trade of Arbroath," which was responded to by Ex-Provost GRANT.

Mr. W. B. M'LUSKY, of Perth, proposed "The Arbroath Gas-Works," and in doing so said that the progress of the Arbroath gas undertaking might be said to date from 1902. At that time, owing to very heavy capital charges, gas was sold at a high price. They then sold 66 million cubic feet a year; now they sold 99 millions. At that time they paid 1s. 2d. per 1000 cubic feet for interest, sinking fund, and annuities, and they had a gross fixed charge of 19s. 5d. per 1000 cubic feet of gas sold; now, through the most excellent management of Mr. Young, they had been able to reduce this fixed charge to 13s. 7d. The consequence was that, notwithstanding many important extensions and improvements in the works, they were able to sell gas at 2s. 8½d. per 1000 feet, as compared with 4s. 4½d. in 1902. It would not be possible to carry on works of such magnitude with so much success without administrative ability of a very high grade. They had, at the table, examples of the type of men whom the people of Arbroath had chosen to manage this revenue-producing department. It was not every town which was so circumstanced. He considered that Mr. Young had been particularly fortunate in his Council, and that the ratepayers had responded, to a most exemplary degree, to the efforts which the Corporation had made to serve them with gas at a low price. During the last seven years, consumers in Arbroath had increased by 500, and the number of gas-cookers had increased from 800 to over 4000. These figures were phenomenal. They had nothing to compare with them—if, for the moment, they forgot Dundee. It was a very big effort to get 3200 ratepayers of Arbroath to come over to gas cooking in such a short period. In looking over the Corporation gas accounts, he had been very much impressed with their courageous policy in the finance department. Every liability, every obligation, had been met, and no burdens had been carried forward to posterity. They had expended £11,400 out of revenue, in reconstructing the works; and in the conception and execution of all these works, Mr. Young had shown that he was an Engineer of no ordinary standard.

Bailie SMITH, in acknowledgment, said it had taken a great deal of trouble, of anxiety, and of skill, to bring the gas-works to what they were. He could not tell them when gas-works were first erected in Arbroath; but they had reports of the Gas Company as far back as 1825. When Mr. Young last year complained to them in respect of the inefficiency of storage, it was not the first report on the subject which had been given to the gas authorities; for in 1863 the Manager reported that they had a storage capacity of 82,000 cubic feet, with an average nightly output, after Martinmas, of from 120,000 to 130,000 cubic feet, and on the last two nights of the year, 150,000 cubic feet. On these two occasions they had only storage for half-a-night's supply. The last erected gasholder was then built. The smaller holder was built in the years 1850-51. In 1832, the annual consumption of gas in Arbroath was 250,000 cubic feet; in 1842, it was 5,207,000 feet; in 1852, 10,594,000 feet; in 1864-65, 26,420,000 feet; in 1874-75, 33,873,000 feet; in 1884, 41,825,000 feet; in 1892, 46,306,000 feet; in 1902, 77,397,000 feet; and in the past year, 97,665,000 feet. The last five years, the consumption of gas had increased by over 20 million cubic feet per annum. In 1852, the prices of gas, taken from the books in the office in Arbroath, were: In Arbroath, 5s. 10d.; in Aberdeen, 6s. 6d.; in Brechin, 5s. 10d.; in Cupar, 7s. 6d.; in Dundee, 5s. 6d.; in Dunfermline, 6s. 3d.; in Forfar, 8s. 4d.; in Kirkcaldy, 5s. 10d.; in Montrose, 5s. 10d.; in Perth, 7s.; and in St. Andrews, 7s. 6d. He expected that in these places they were as proud to be able to supply comparatively cheap gas to-day as they in Arbroath were. One other point which he wished to touch upon was the valuation of the gas-works. In 1856, the works were assessed at £572. In 1860, the amount paid in rates and taxes was £109; last year they paid £819. The Assessor this year proposed increasing the valuation by about £500, which would mean that they would have to pay over £900 in rates and taxes next year. This was being charged upon them on account of their present system of financing. It was a system which he did not think was altogether fair for the works. On the one hand, they had people who were talking about being thrifty and paying everything in ready cash; but whenever they started to pay ready cash, up went the valuation, because it was said that the money they paid for various articles of plant was really profit, and must be taxed. They, however, did not mind this so much, because the additional taxation on the gas-works would mean considerable relief to the ratepayers. They were also getting cheaper gas, which meant a double advantage to the community through the gas-works being successful. When the works were taken over, there was £20,000 worth of stock, upon which they had been paying practically £1400 yearly as interest. They had paid, as interest, £50,000; and they had not redeemed £2000 of the stock. They had to put the cost of the new holder and condensers to the suspense account, which would bring it up to some £6000 or £7000; but they wanted to have this paid off in three years' time. Some people might say that they were treating the present consumers very unfairly. He did not think they had anything to complain of, seeing that they were having gas supplied so cheaply; and he did not think posterity would feel they had been heaping burdens upon them. Posterity would have to thank them a great deal more than they had to thank their predecessors.

Ex-Bailie DUNCAN proposed "The Engineer and Contractors."

Mr. YOUNG, speaking of the new plant which had been laid down during the 7½ years of his management, said that the new holder was only a very small part. He should say it would cost only about a fourth of the sum which had been spent altogether in the gas-works. First of all, they erected a complete retort-bench, consisting of 80 retorts, in

ten ovens, back to back, eight retorts in each oven, with all the iron-work, hydraulic main, foul main, dip pipes, off-take valves, and the other appointments of a retort-bench. The bench was fired on a full regenerative system, with an all-round subway. The bench was capable of something like 25 per cent. more work than they at present required it to do, at the maximum output. The foul main had been carried round the retort-house, for the cooling of the gas gradually, with the consequent preservation of the rich hydrocarbons, which otherwise would be lost. Two 8-inch retort-house governors, of Messrs. Parkinson and W. & B. Cowan's make, had been fixed on the foul main. By means of them they were able to work with a much less seal, with the consequent result of a greater yield of gas, and a reduction of other evils, and with entire safety from the risk of over-pulling by the exhausters. Part of the retort-house roof fell in upon the bench one summer morning, and this had to be replaced. The new roof was entirely of steel, and in one span; so that they now avoided the pillars which were used formerly to support the roof, and which obstructed the men in their work. The walls of the retort-house were raised considerably—making a cooler and airier house. The retort-bench and the house were designed to enable them to introduce stoking machinery, should this be found desirable. The exhausting plant was of a very antiquated type, and had been replaced by new exhausters of Waller's four-blade design. Each exhauster was now complete, with its own engine on its own bed-plate, and was capable of the entire work required of it, without the assistance of the other. Immediately after the exhausters they had connected a Livesey tar-extractor, made by Balfour and Co., and a set of Holmes's rotary brush scrubbers, by means of which the extraction of all the ammonia was achieved, and also a large proportion of the impurities which formerly travelled on to the purifiers and made purification costly. The old pumping machinery was worn out—costing, in a year, very nearly as much to repair as new ones could have been bought for. These had been thrown out, and new ones put in, to deal with tar, ammonia, and water; and an additional tank had been built to assist in the separation of the tar from the ammoniacal liquor. A Maxim carburettor had been installed and used since 1903. The old station meter was over forty years of age. It was too small, and threatened to collapse. This had been replaced by a new meter of greater capacity; and the house in which was the old one had been utilized for the holding of a coal-testing plant, consisting of an iron retort, fired by gas, with water-tube condensers, a scrubber, a purifier, and a 100 cubic feet and a 5 cubic feet gasholders. A new 20-inch station governor, made by Messrs. Peebles and Co., Limited, had been connected between the gasholder and the town. The old governor was of a very old type, and required a variation of from 2-10ths to 3-10ths to bring it into automatic action. The steam-boiler, used for sulphate manufacture, steaming the furnaces, and for other general uses about the gas-works, was much too small. A new and larger boiler had been put down and coupled up; so that they now had two boilers, giving them a stand-by. A new sulphate plant, capable of producing over 30 cwt. of sulphate, had been installed. This consisted of a still and superheater of Gillespie's patent, liming apparatus, condensers, and an enlargement of the oxide purifier for treating the waste gases. All the connecting pipes and the bye-pass arrangements for the various parts of the plant, including the new holder, had been procured from the founders and fitted up by their own employees. With the exception of the retorts, the plant was equal to a daily make of a million cubic feet of gas, which was twice the quantity required at the present time. The distributing mains in the town had been enlarged in many of the streets, and an extra 12-inch main had been laid from near the gas-works to well beyond the centre of the distributing area. No money had been spent unnecessarily upon buildings. All the plant which had been put down had been the very best obtainable; and in no case could they say that the results had not been all that was expected. They had purchased twelve railway waggons, by which they effected a considerable saving in railway carriages. A set of water-cooled condensers, capable of dealing with a million cubic feet of gas per day, had been erected this year. The Corporation's property had been increased in value by £4500 worth of gas-stoves, and by £1500 worth of coin-meters. The new holder was on the spiral-guided system, which enabled them to do away with costly columns and girders; and it had been erected for something like £1200 less in consequence. The thinnest plates on the top lift of the holder were No. 11 B.W.G., and on the lower lift No. 12 B.W.G. The storage capacity was now 700,000 cubic feet; and the maximum output for one day was 520,000 feet. The new holder, he was thankful to say, had been erected without accident to life or limb, and without a hitch. They had tested the holder; and in his opinion it was perfect. With the upper lift the holder displaced 4 inches of water, and with the lower lift 6½ inches. The two lifts weighed 120 tons.

Mr. KING also responded. He said they had been constructing these holders for the last twenty years, so that the style was no experiment. Since they began, there had been erected 300 of these holders in this country and abroad. They had just completed a very large one in Buenos Ayres. If they could work holders of this description where typhoons and monsoons were to be met with, surely they need have no hesitation or fear in using one in Arbroath. The holder looked, to all intents and purposes, as though it had no means of support; but he could assure them that it had, and that it was well and scientifically guided. In Scotland, they had been rather slow in adopting the new holder, but at the present time there were about twenty erected there, which showed that they were waking up to the advantages, in cost and otherwise, of these holders. He ought not to conclude without congratulating the Corporation on having such an able Engineer as Mr. Young. He had turned their gas-works inside out, to the great advantage of the people of Arbroath.

A number of other toasts were honoured.

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The Directors of the Dowlais Gas and Coke Company, Limited, have filled the vacancy caused in the management by the death of Mr. David Jones by the appointment of Mr. J. H. Jones, a son of the deceased, who has been in the service of the Company for over four years, and for the past fourteen months has satisfactorily discharged the duties of Deputy-Manager.

# GAS-WORKS AT LEVIN (N.Z.).

### Opening Ceremony.

THE Municipality at Levin, which is a progressive town in the Manawatu district of New Zealand, have recently been engaged in the erection of gas-works, the official opening of which took place towards the end of July. The ceremony of turning on the gas was performed by the Mayoress, Mrs. B. R. Gardener, who was presented by Mr. J. W. Blackman (Manager of the Masterton Gas-Works), the Engineer who had superintended the construction of the works, on behalf of the Gas Committee of the Levin Borough Council, with a gold brooch in the form of the wheel of a gas-valve, as a memento of the occasion. Mr. Blackman, on his own behalf, also presented the Mayoress with a silver card-case suitably inscribed. Thereafter, at the invitation of the Mayor, the company adjourned to tea.

The Mayor, in thanking the visitors for their attendance, said that a sum of £10,000 was borrowed; but the Council had sufficient faith in the prosperity of the borough to make full provision for the requirements of years to come. For this reason, up-to-date works and buildings had been erected. He did not think the works would be required to produce up to their full capacity for the next five years. Probably no small gas-works to serve a population of the same dimensions as that of Levin had started with better prospects. Some 7 miles of cast-iron mains had been laid, and 3 miles of wrought-iron mains. Levin had only some 18 miles of streets; and the total area was 1½ square miles. The pipes tapped almost every house in the borough. The undertaking would start with over 100 householders using gas; and in addition there would be 40 street-lamps. He could say with all confidence that one month from date there would be 175 gas consumers in the borough. In regard to the plant, there was only one bench being worked out of three installed. The Engineer had been given a free hand in regard to the installation. He was told to spend the £10,000 to the very best advantage; and no cleaner work had been carried out in any place in New Zealand. Altogether about £9000 had been spent. Of this, £3800 represented English contracts; for materials purchased locally and throughout New Zealand, £3000 had been paid away; and about £1300 had been spent in wages. In addition to the £9000, a large sum had been spent on lamps and gas-fittings, the Council having decided to push this part of the business.

Mr. Blackman, in response to the toast of his health, remarked that he had designed the works so that very little additional expenditure would be required for many years. At present only three retorts would be used; but as Levin increased in size and the public came to appreciate the benefits of coal gas, the five retorts in each of the three arches could be utilized, so that a maximum of fifteen retorts could be brought into work, producing 75,000 cubic feet of gas daily. Messrs. Whittaker and Williams, the Contractors, had carried out their work well; and the Manager (Mr. C. Shaw) had put the plant down excellently.

The plant, as already mentioned, consists of three settings of five 21-inch by 15-inch ⏀ retorts. They are on the regenerative system, by Messrs. Gibbons Bros., who also supplied the iron-work, hydraulic main, self-sealing mouthpieces, and fire-clay material. The holder is 40 feet by 16 feet deep, in steel tank. There is a tower scrubber, with washer at bottom, and also pipe condensers. The two purifiers are 8 feet square by 4 feet deep, on Green's patent, fitted with Milbourne's valves. All this portion of the plant was supplied by Messrs. C. & W. Walker. The gas-engine and exhauster are by the Bryan Donkin Company, the station-meter by Messrs. James Milne and Son, and the station-governor by Messrs. Peebles and Co. The meters are all dry, and have been supplied by Messrs. Alder and Mackay.

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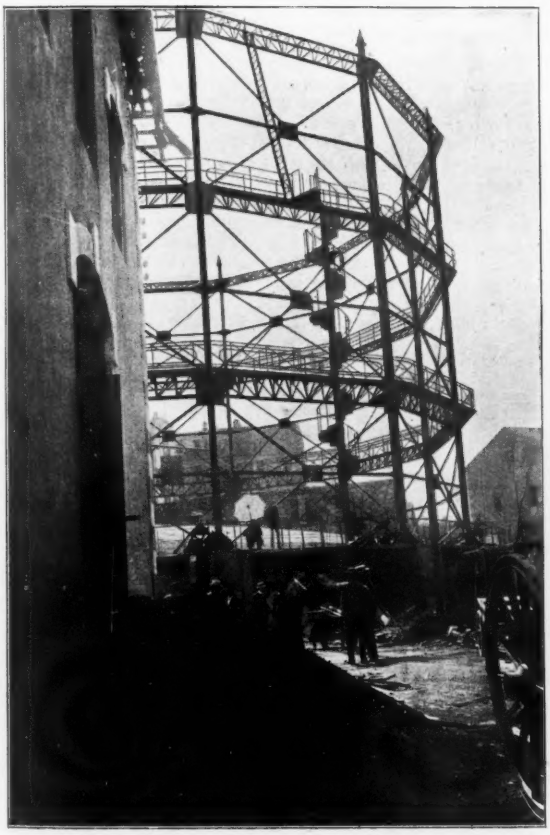
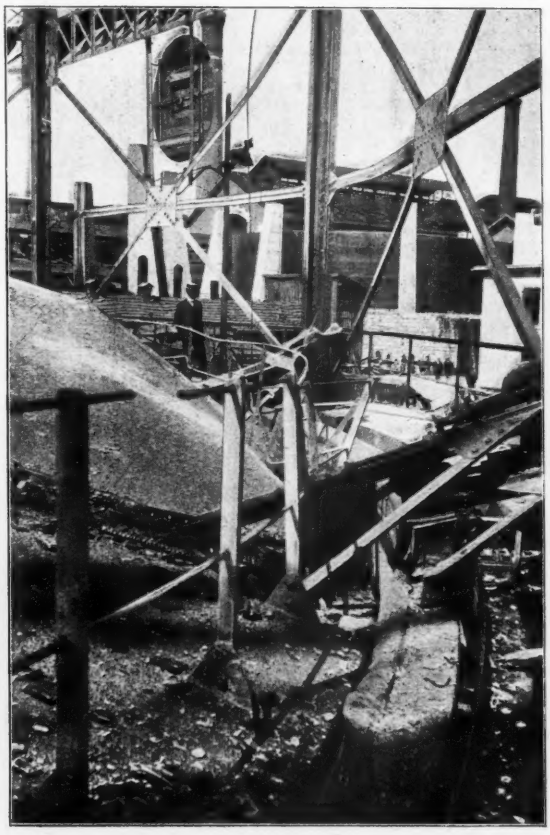
In addition to filling the post of Manager of the Workington Corporation Gas-Works by appointing Mr. E. G. Hutchinson, as recorded last week, the Council have agreed to a recommendation of the Gas Committee that Mr. John R. Boadle, of Workington, who served his articles under the late Manager (Mr. George Keyte) be appointed Assistant Manager, at a salary of £104, to rise by yearly increments of £10 for three years.

An interesting presentation took place at the Ilford Gas-Works last Friday. The Assistant Manager, Mr. Thomas S. Canning, was married at Newport (Mon.) on Wednesday last; and as he has during his two years' occupancy of his position as Assistant Manager succeeded in getting himself immensely popular with the staff and employees, it was decided to make him a presentation on this auspicious occasion. The presentation, which was made by Mr. W. B. Farquhar, the Engineer and Manager of the Company, took the form of a handsome pair of bronze statuettes, representing the Sower and Reaper. There was a large gathering present at the ceremony; and on handing the present to Mr. Canning, Mr. Farquhar referred to the immense popularity Mr. Canning enjoyed, and hoped the presentation would always remind him of the esteem and respect in which he was held by all with whom he had come in contact at the works. Mr. Canning replied in suitable terms, and said he was deeply affected at the way in which his colleagues had shown their appreciation of him. The presentation would long remain with him as a memento of a very happy occasion.

# THE RECENT EXPLOSION AT THE GENEVA GAS-WORKS.

**Two Views of the Wreck of the Purifier and Station-Meter Houses.**



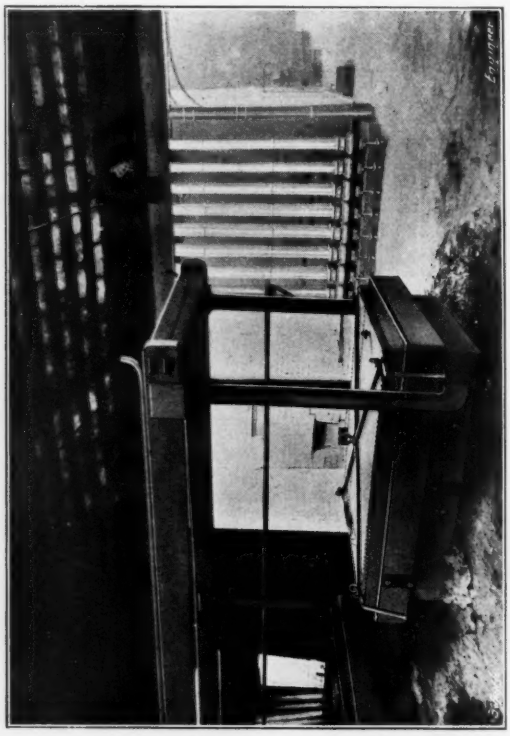


**The Gasholder and its Framing after the Explosion.**

We have received from an esteemed correspondent a series of photographs—taken by M. Louis Tritten—showing some of the effects of the recent lamentable explosion at the Geneva Gas-Works, and so are enabled to supplement the particulars given in the "Journal" for Aug. 31 as to this disastrous affair.

Last Friday afternoon, M. Albert Gampert, the Administrative Adviser in charge of the Industrial Service of Geneva, issued a notice, which was posted on the walls throughout the town, to the effect that consumers could again use gas with the exception of those living in certain of the outside districts; and in these latter it would be available in two or three days. Consumers were reminded that they must strictly conform to the following regulations: "(1). For the purpose of clearing the pipes of air, open the meter, then turn on one of the heating or lighting burners—for preference that which is furthest away from the meter, and this in a room where the window has been left open. (2). Wait till the gas has reached the burner after having driven out the air which is in the pipes. This can be easily found out by the smell. Then apply a light and wait a few moments to see that it does not go out. If the gas does not pass through the pipe, or if it goes out, be careful to close the meter again and all the cocks, and advise the Gas Department. If these precautions are strictly observed, there will be no explosion nor any danger to fear. If these instructions are not properly carried out, the City of Geneva will not be responsible."

**Thorium Nitrate.**—We understand a change in the situation has taken place in America in regard to thorium; the duty having been advanced from 25 to 40 per cent.

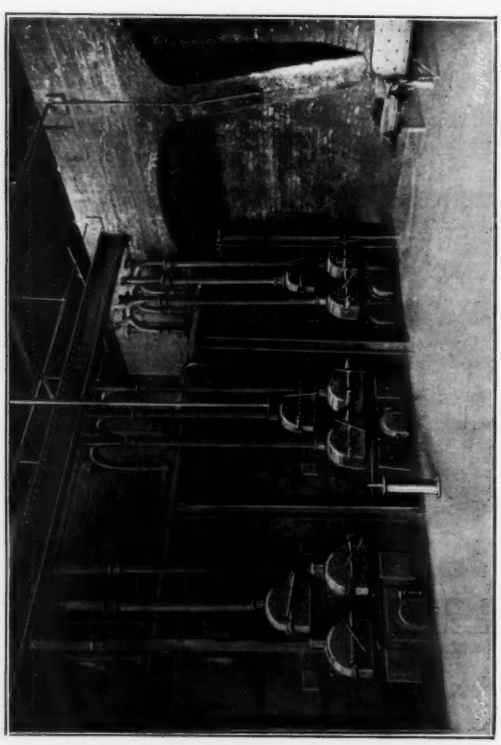


The Purifying and Condensing Plant.

## MURDOCH'S GAS PLANT AT SOHO.

We are indebted to the "Engineer" for the reproduction of the accompanying two blocks of Murdoch's gas plant at Soho, which appear in their current issue among a number of interesting photographs of old tools at these Birmingham works. The photographs were taken before the works were acquired by Messrs. W. & T. Avery, Limited.

With regard to the gas manufacturing apparatus, our contemporary says this plant was used until the old works changed hands; and in Murdoch's own time it had lighted the underground shops or caverns in which he did much of his mechanical work.



Interior of the Retort-House.

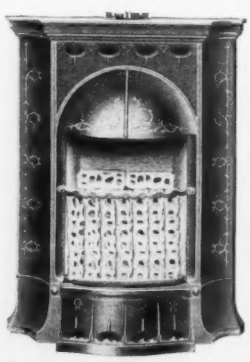
## ARDEN HILL AND CO.'S NEW FIRES.

Again Messrs. Arden Hill and Co. are well in evidence with their new apparatus for the gas-fire season. Heading their list of novelties is the "Versailles"—a new gas-fire of quite distinct class, the striking feature of which, apart from its very fine design, is the embodying of the makers' new ideas as to greatly enlarging the width of the fire space. This new departure enables any ordinary coal-fire to be replaced by a gas-fire having the same extent of radiating surface, and so removes one more obstacle to the great popularity of the newer apparatus. The "Versailles," which is made in two sizes, 17-inch and 21-inch respectively, provides an amount of firewidth far in advance of anything hitherto attempted in this direction, yet it is claimed that, by its including the "Simplex" shallow-fire principle and the patent "Thermo" firefront, it consumes no more gas than the best ordinary stoves. The fire is chaste and artistic in design; and the makers believe that it will achieve a high degree of popularity among gas consumers as well as among gas authorities.

The "Versailles" Gas-Fire.

The "Thorium" Gas-Fire.

The winter season of 1907-8 was marked by the introduction of Messrs. Arden Hill and Co.'s "Radium" stove—a "Slot" gas-fire, which quickly earned a high reputation for itself as being an ideal fire for hiring-out purposes. This fine effort in stove design has been followed up this season by the introduction of two other similar fires—one, with square top, named the "Thorium," which is made in three sizes, with firewidths of 8½, 10, and 14 inches respectively, the other—a nursery fire—is named the "Cerium." The latter is made in two sizes, 10-inch and 14-inch. It is listed at quite a moderate figure, and is thoroughly up-to-date in every detail. Thus a series of three excellent slot gas-fires is provided wherein all the removable parts are common to the three fires, and therefore interchangeable, as has been the case with a number of the firm's fires for a period of years.



The "Cerium" Gas Fire.

The Patent "Adept" Basket Fire—Showing adjustable fender partially removed.

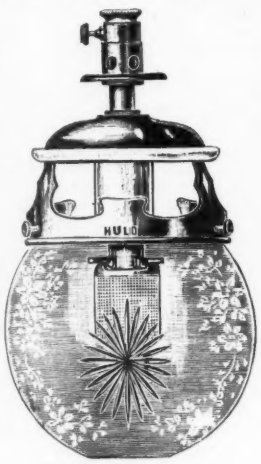
Another novelty which cannot fail to be of interest is the "Adept." This is a new basket fire (for which a patent has been applied for), which, taking as its point of departure the old-fashioned "basket" fire, is intended to compete with the most modern fires hitherto introduced. It is fitted with the "Thermo" patent and the "Simplex" shallow-fire arrangement; and a special feature, of no small importance, is a patent adjustable grate-front which may be had with the stove. This can be raised or lowered to hide the ash-pan opening of the coal-grate. When raised, it is held in place by two screw knobs. Messrs. Arden Hill's fires are being fitted this season with the (1909) patent form of "Simplex" gas and air adjuster (as described and illustrated last week, p. 630), whereby a perfectly graduated adjustment between minimum and maximum limits is provided without the employment of screw threads and consequent leakage. The new "Simplex" secures equally unimpeded pressure at all points.

The firm have also introduced a new invention for preheating the gas before it enters the burner, by which the radiant heat is thus greatly increased. This contrivance can be fitted to the "Versailles" fire at a small extra cost.

## SOME MORE UP-TO-DATE LAMPS.

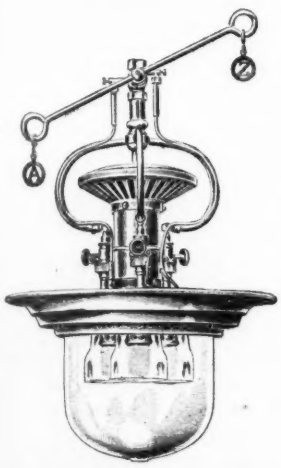
PATTERNS of up-to-date inverted incandescent gas-lamps for the forthcoming lighting season are now being introduced in numbers which demonstrate the continued, and increasing, well-deserved popularity of this form of lighting.

In their newly-issued catalogue (which is full of very attractive designs of inverted gas-fittings), Messrs. D. Hulett and Co., of No. 55, High Holborn, give "pride of place" to their improved "Hulo" burner, which is their leading line in inverted burners, and for which they are experiencing a very large demand. It is of heavy quality, well finished, and neat in appearance; and it is now fitted with a china tube over the gas-way, which, with the china top, prevents the deterioration of the metal parts, besides being of assistance in the matter of reflection of the light. A new pattern insulated regulator has also been introduced, so that the burner can be easily governed to suit all varying pressures and qualities of gas. The dome-shaped top prevents contamination of the inlet-air by the products of combustion.

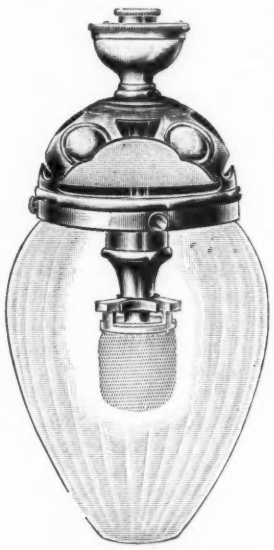



The "Hulo" Burner.

Two of the leading lines for this season of Messrs. J. & W. B. Smith, of No. 17, Farringdon Road, E.C., are the "Imperial" inverted indoor lamp and their improved "Veribest" gas-burner. The "Imperial" is a powerful regenerative lamp, which is claimed to have a lighting capacity of about 125-candle power per burner; the consumption being in the neighbourhood of 4 cubic feet of gas per hour. It is listed for two, three, or four lights; and the burners have gas and air adjusters to them. Another point in its favour is the easy access that can be had to all parts of the lamp, which has a handsome appearance, in white enamel, relieved with gold lines. As to the already well-known "Veribest" gas-burner, this has been brought up to date by the addition of a new white enamelled heat disperser, for the prevention of discoloration of the fittings. The burner is provided with a special mixing-chamber for the proper admixture of the air and gas; and there is an air-regulating shutter at top. All parts of the burner—which is neat and well finished—are easily renewable.



The "Imperial" Regenerative Inverted Indoor Lamp.



The "Veribest" Inverted Incandescent Gas-Burner.

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According to the "Ironmonger," an unusually active business is now being done in Germany in illuminants of various kinds, and especially in incandescent gas-mantles, though it is feared that exceptional slackness will succeed the present rush when the new taxes come into force. The new tax on incandescent goods does not apply to stocks in the hands of the trade when the new taxation comes into force on Oct. 1; but a general misapprehension of the meaning of the clause is probably the explanation of the present rush of buyers. The Association of Incandescent Gas-Mantle Manufacturers (which comprises all German producers of importance) announce an advance in prices. For the most part, however, manufacturers do not derive much benefit from the new quotations, as practically all their present output was contracted for at rates formerly ruling.

## AMSTERDAM MUNICIPAL GAS-WORKS.

### Report for 1908—Past Ten Years' Working.

It was ten years on Aug. 10, 1908, since the Municipality of Amsterdam took the gas-works over from the Imperial Continental Gas Association; and some figures from the annual report for 1908 may be given to show the progress made during this period. For these, we are indebted to Heer J. Van Rossum du Chattel, the Manager of the Works.

On Aug. 10, 1898, the work began with some 800 officials and workmen; while ten years later this number had increased to 2072—the number of workmen being 1933 at the end of December, 1908. During the first year of working (Aug. 10, 1898, to Aug. 10, 1899), £52,600 was paid out in salaries and wages. From Aug. 10, 1907, to Aug. 10, 1908, it was £139,305. The total amount of salaries and wages paid over the past ten years was £1,024,468.

From Jan. 1 to Aug. 10, 1898 (the last months during which the Imperial Continental Gas Association delivered gas), the consumption was 600,575,594 cubic feet; whereas during the same period in 1908 it was 1,637,277,576 cubic feet. The total consumption was: In 1898, 1,104,664,506 cubic feet; and in 1908, 2,919,056,773 cubic feet.

| | Gas-Meters. | Ordinary. | Prepayment. |
|---|---|---|---|
| On Aug. 10, 1898 there were | 25,500 | 24,594 | 916 |
| " 1908 " | 95,934 | 44,087 | 51,847 |

In the past ten years there was paid:—

| | |
|---|---|
| Interest on capital | £449,903 |
| Amortization | 405,435 |
| Contribution to the Municipality | 692,613 |
| Extra-reserve | 91,666 |
| Written off (depreciation) | 558,145 |
| The works, &c., were bought for | 1,433,872 |
| Erections and extension, including the unfinished third gas-works so far as the half year of 1908 | 818,322 |

After writing off £558,144, the total value (in the books) of the buildings, yards, mains for all the works, &c., was, after ten years, £1,694,050. During these ten years there were produced 20,307,045,000 cubic feet of gas, for the make of which there were used about 1,781,413 tons of coal and coke.

In 1908, there were supplied to the gas-works by railway and boat (excluding the supply in carts, &c.):—

| | Waggons. | Boats. | Tons. |
|---|---|---|---|
| Coal | 16,364 | — | 221,255 |
| Sulphuric acid | 151 | — | 1,564 |
| Benzene | 188 | — | 1,923 |
| Solar-oil | 301 | — | 2,746 |
| Lime | 30 | — | 307 |
| Chemicals | 6 | 22 | 188 |
| Retorts, fire-clay, &c. | 166 | — | 1,751 |
| Ironwork, &c. | 76 | — | 720 |
| Sand, mortar, lime, &c. | 59 | 6 | 1,051 |
| Oxide of iron for purifying | — | 10 | 1,313 |
| Total | 17,341 | 38 | 232,818 |

The retort-house at the Eastern Gas-Works contains 80 furnaces of nine retorts each, provided with Arrol-Foulis machinery. At the Western Gas-Works, there are two retort-houses of 40 furnaces with nine retorts each. Eight of the furnaces are provided with De Brouwer through retorts. The gas-works contain 1440 retorts in all, of which a maximum of 1016 were used at a time. The maximum of fire-days of one furnace has been 1584. There were loaded a total of 1,403,263 retorts, with an average weight of 324 lbs. 5 oz. The average weight of coal distilled per retort per diem was 1684 lbs. 5 oz.

The average production of coal gas per retort and per diem amounted to 7910 cubic feet.

For the distillation of gas there were used:—

| | | |
|---|---|---|
| German coal | 141,563 tons | = 69·68 per cent. |
| English coal | 61,611 " | = 30·32 " |
| Australian cannel | 4 " | |
| Total | 203,178 tons | |
| For engines and workshops | 236 " | |
| Total use of coal | 203,414 tons | |

For enriching, there were employed 1909 tons of benzene and 3137 tons of solar-oil.

The production of gas, including that resulting from the benzene, per ton of coal was 10,518 cubic feet.

The total production of mixed gas was—

| | Cubic Feet. | | Cubic Feet. |
|---|---|---|---|
| 1899 | 1,223,661,918 | 1904 | 2,198,060,332 |
| 1900 | 1,413,128,060 | 1905 | 2,356,524,150 |
| 1901 | 1,628,532,480 | 1906 | 2,604,312,126 |
| 1902 | 1,825,902,124 | 1907 | 2,819,807,309 |
| 1903 | 2,056,137,396 | 1908 | 2,918,523,210 |

The maximum daily production, on Dec. 23, was 11,264,583 cubic feet, or 0·385 per cent. of the yearly amount. The minimum daily production, on June 8, was 4,940,792 cubic feet, or 0·164 per cent. of the yearly production. With the coal gas was mixed 781,441,226 cubic feet of water gas, or 26·86 per cent. of the total gas production. So the production of coal gas only amounted to 2,137,081,984 cubic feet.

The consumption of gas for 1908 was divided as follows:—

| | Cubic Feet. |
|---|---|
| Private persons through ordinary meters | 1,690,065,334 |
| ,, ,, ,, prepayment meters | 952,854,582 |
| Municipal buildings | 50,576,055 |
| Public lighting | 123,958,829 |
| Special contracts for illumination, &c. | 1,362,373 |
| Water gas and sulphate and cyanide plants | 3,059,371 |
| Used in the works and loss (3·329 per cent.) | 97,180,229 |
| Total consumption | 2,919,056,773 |

The maximum delivery of gas per diem, on Dec. 24, was 12,385,532 cubic feet, or 0·424 per cent. of the delivery of the whole year. The minimum day was May 31, with 4,406,452 cubic feet, or 0·151 per cent.

The capacity of the gasholders is—

| | Cubic Feet. |
|---|---|
| Three two-lift holders | 2,330,896 |
| One four-lift holder | 3,531,660 |
| Three three-lift holders | 4,528,294 |
| Total | 10,390,850 |

or 83·89 per cent. of the highest delivery per diem.

For water gas there are two relief holders of 70,633 cubic feet each.

The following are the figures with regard to coke:—

| | Tons. |
|---|---|
| The production of coke, including breeze, was | 145,648 |
| The stock on Jan. 1, 1908, was | 3,160 |
| Total | 148,808 |

The coke was used thus—

| | Tons. |
|---|---|
| Steam-boilers | 1,950 |
| Furnaces (heating and drying) | 33,438 |
| Water-gas production | 13,461 |
| Boilers (water-gas plant) | 5 |
| Heating gasholder-tanks, mainlaying, &c. | 610 |
| Sold | 56,051 |
| Small coke and breeze | 40,160 |
| Total | 145,675 |
| Stock on Dec. 31, 1908 | 3,133 |
| Total | 148,808 |

For the furnaces there were used 369 lbs. of coke per ton of coal. The production of coke per ton of coal was 1606 lbs., breeze included.

Of the breeze, there was used—

| | Tons. |
|---|---|
| Steam-boilers (gas-works) | 18,995 |
| Steam-boilers (water-gas plants) | 5,274 |
| Heating gasholder-tanks, buildings, &c., and asphalting | 689 |
| Sulphate and cyanide plants | 3,360 |
| Sold as small coke and breeze | 12,249 |
| Total | 40,567 |

Of tar, there was produced 19,553,136 lbs., or about 96 lbs. per ton of coal. At the Eastern Gas-Works, 2,914,164 lbs. of water-gas tar was produced.

Some 3,649,400 lbs. of sulphate of ammonia was made, or 18 lbs. per ton of coal—a low figure, due to various circumstances. The returns will be much higher in 1909.

Yellow prussiate of potash was only produced at the Western Works. The production was 128,866 lbs. This was less than usual; the works having been stopped for some months.

At the Western Works, 94 purifiers were cleaned, against 126 in 1907. This reduction is due to the use of "Lux Massa." At the Eastern Works, 53 purifiers were cleaned, 24 of which were for the water-gas plant. About 1708 tons of spent oxide were sold.

The length of the mains at Dec. 31, 1908, was 1,293,582 feet.

| Diameter in Inches. | Length in Feet. |
|---|---|
| 47 | 273 |
| 36 | 38,271 |
| 32 | 1,646 |
| 30 | 43,892 |
| 22 | 1,507 |
| 18 | 477 |
| 16 to 4 | 1,207,516 |
| Total | 1,293,582 |

In 1908, 9389 ordinary meters were fixed and 8890 removed; while 64,467 complaints, 38,655 of which were from prepayment consumers, were treated. For prepayment meters, 7745 new installations were made, of which 5140 were for new consumers. On Dec. 31, 1908, 17,571 wet meters and 27,137 dry meters were in use—44,708 in all, with 399,970 lights. There were 54,192 prepayment meters. The average consumption of gas through prepayment meters was 17,588 cubic feet per annum. The largest one stated was 101,712 cubic feet. For this prepayment, 80,941,080 halfpennies were used.

For the public lighting, there are used 9089 burners, burning all night, except some of the group-burners, which are partly extinguished at 1 o'clock. The average time of burning for a light was 3955½ hours for the whole year. The total time of burning for all the lights was 38,865,411 hours. There were used 118,855 mantles; so that the average time a mantle was lighted was 327 hours, against only 146 in 1907. This difference is due to the use of copper-cellulose mantles. One hundred oil-lamps for the public lighting were also under the care of the gas-works. The mantles used for the public lighting were burnt-off at the gas-works; and part of them were also impregnated there. A pound of nitrate of thorium, with 1 per cent. of nitrate of cerium, was sufficient to impregnate 337 mantles,

With regard to financial matters, some figures may be of interest.

| | |
|---|---|
| For coal used for carbonization was paid | £161,622 0 0 |
| The average price per ton in the works was | 15 11 |
| Wages for carbonization, engine-drivers, &c. | 28,934 0 0 |
| Repair of the works | 28,831 0 0 |
| Repair of the mains | 12,009 0 0 |
| Total amount of wages paid | 111,877 0 0 |

Furthermore, £2773 was paid to sick and wounded workmen.

Wages paid to workmen during holidays, £3490.

The cost of production per million cubic feet of mixed gas amounted to £128 16s. 11d., divided as follows:—

| | |
|---|---|
| Coal | £75 12 6 |
| Enriching | 8 10 |
| Purification | 18 0 |
| Wages for carbonization, engine-driving, &c. | 13 10 9 |
| Cost of coke manipulation, &c. | 3 6 2 |
| Manufacture of sulphate of ammonia | 2 9 1 |
| Manufacture of yellow prussiate of potash | 1 5 9 |
| Various expenses for manufacture | 4 1 1 |
| Works bathing and washing establishments | 14 6 |
| Repair of works | 13 9 9 |
| Total | £115 16 3 |
| Receipts for bye-products (coke, tar, &c.) | 55 11 9 |
| Net cost of coal gas, without interest, and amortization | £60 4 6 |
| Cost of water gas | 56 7 3 |
| Cost of mixed gas | 59 3 9 |
| Interest, amortization, use of gas at the works, &c. | 30 13 8 |
| Cost of mixed gas in the holder | £89 17 5 |
| Cost of distribution | 19 3 11 |
| General expenses (salaries, &c.) | 19 15 7 |
| Total cost of the gas | £128 16 11 |

In the period of the concession to the Imperial Continental Gas Association, the price of gas was 4s. 3d. per 1000 cubic feet through ordinary meters, and 4s. 9d. through prepayment meters. Installations of prepayment meters are free, including two boiling-burners and three burners, on condition that a minimum of 14,150 cubic feet per year is used. Since Jan. 1, 1899, the price of gas has been 3s. 4d. per 1000 cubic feet through ordinary meters, and 3s. 6d. through prepayment meters.

## NEW USE FOR COAL-TAR PRODUCTS.

### Manufactured "Trinidad Lake Bitumen."

A correspondent calls attention to another instance of the inexhaustible field for scientific research presented by a study of the properties of coal tar. It is the production, under British patents, of the best quality of "Trinidad Lake Refined Bitumen" from a base of plastic pitch (denuded of all matter deleterious to electric cables—such as naphtha, phenols, and creosote) during the ordinary course of a tar distiller's business, and in the ordinary appliances in common use at a tar distillery; so that the residual product to be run out of the tar-still, instead of being medium pitch, is the highest grade bitumen.

The proposal of the patentee—Mr. Thomas Marriott, of Kingston-on-Thames—is to form a base of bituminous matter of a mixture of the last heavy distillate and medium pitch so as to produce a minimum of carbonaceous matter, which is not relied upon in the least as a stiffener to produce the required rigidity and high melting-point of a natural bitumen product. Under his process of manufacture, and while the plastic pitch is in a very hot melted state in the tar-still, there is added to it a proportion of a plastic mineral, undecomposable at any heat to which coal-tar pitch can be taken, and which is of the same kind as that so perfectly combined with the soluble matter in Trinidad Lake bitumen. In the new manufacture, it is used in practically the same proportion. The substance which gives to the natural product the premier position of all bituminous insulating compounds and their allied hydrocarbons (on account of the tenacity of its particles and stability, and which mineral is inherent therein in the form of an impalpable powder) is added to, and mechanically mixed with, the bituminous matter in the tar-still; thus forming a manufactured product that is identical with the natural one—the same tenacity of its particles, rigidity without brittleness, and equal stability.

Our correspondent points out that the cost of refining natural bitumen in order to form from it compounds suitable for joint, box, and trench use, is so high as to render the employment of the material so made in many cases prohibitive. Trinidad Lake bitumen is the only known bitumen stiffened with the high-class mineral mentioned; and compounds made from other natural bitumens and from pitches are brought to the required degree of rigidity for insulating purposes, under the processes in common use, by the aid of sulphur or excessive carbonization, with a tendency to crystallize or else rupture and permit the ingress of

moisture to the electric cable—thus leading to faults and leakages. Manufactured compounds of the class last described have been largely used from motives of economy, but with disastrous results; and there is a strong tendency at the present time among the chief engineers of the electricity supply undertakings to go back to Trinidad Lake bitumen compounds, notwithstanding their present high price. It is claimed by the patentee of the so-called "Vulco-Bitumen" manufactured compounds (which is the apt generic designation given to them by him) that he has the exclusive right under his patent to combine together ingredients the same as, or analogous to, those which constitute Trinidad Lake bitumen compounds, and in similar proportions; also that, under his original process (also patented) of intercepting melted pitch products containing a very high proportion of volatile matter in the appliances in which they are usually made, and adding thereto the stiffening substance referred to, he is "able to produce the highest class of manufactured Trinidad Lake compounds at a selling price of unprecedented cheapness—thereby offering efficiency with a great reduction in price."

It is mentioned that these new compounds will shortly be put on the market, and at prices enabling great economies to be effected in the construction, maintenance, and extension of electricity distributing mains; and the patents cover the assimilation of all pitches and bitumens to those of the Trinidad Lake class.

It has remained for a member of the legal profession with very strong leanings for scientific research to make this notable discovery. The inventor has, we understand, in his leisure time, for many years past studied tar distillation theoretically and practically at the works of a very eminent firm of tar distillers, who have given him facilities for pursuing his researches and testing the results of his numerous experiments in their laboratory; and he claims that the firm equally with himself are entitled to the distinction attaching to his most useful invention.

The earliest patent—No. 3063—was dated Feb. 7, 1907;* and the complete specification, accepted Feb. 6, 1908, pointed out that the invention claimed relates to the production of a "new product" made from coal-tar pitch and other material, and which can be used as a binder in asphalte paving and other uses to which ordinary bitumen is now applied. The product is practically unalterable in its molecular structure, and is thus more durable than, and superior to, pitches obtained merely by removing the oils from coal tar. The pitch used is soft in character, and is made by the arrest of the distillation of coal tar; but, as an alternative, ordinary coal-tar pitch can be fluxed by means of solvents to make it of the proper consistency.

The inventor's proposal is to mix coal-tar pitch with dry kaolin, or the like—the combination taking place while the pitch is in a melted state. The crude coal tar is distilled until it is reduced to the proper consistency; and then powdered kaolin or the like is mixed with it to the extent required. There is thus obtained a "judicious combination of materials all containing plastic elements in large proportions." The inventor, however, avoids the use of ground slate, fuller's earth, pumice stone, loam, marl, lime, sand, or anything of a gritty nature; and to this end the kaolin employed is preferably free from mica.

The distillation of the coal tar is arrested at such a period, after the temperature of 280° C. has been reached, as will bring the volatile matter in the still to any point required within the limits of proportion of 55 to 65 per cent.—thus retaining a considerable quantity of the tar or heavy green oils, as the distillation is stopped while the mass still contains 10 to 15 per cent. more of such oils than are retained in the ordinary medium pitch of commerce, which contains about 50 per cent. of volatile substances. To the mass, while hot, there is added, in any suitable mechanical mixer—such as is commonly used in the manufacture of coal-tar products—the dry, powdered kaolin or like high-grade clay containing a large proportion of kaolinite plastic substances. The addition of the kaolin has the effect of solidifying and rendering the product viscous and ductile; the proportion of kaolin added depending on the amount of ductility and hardness required.

As to the comprehensiveness of the words "kaolin and the like," the inventor points out that the best classification of minerals containing kaolinite plastic substances is in the technical work on "Clays" by Professor Heinrich Reis, Ph.D., published by Messrs. Chapman and Hall, in 1906. According to his authoritative classification, the words "kaolin or the like" are taken to include all high-grade clays containing a large proportion of kaolinite plastic substances—viz., kaolin, china-clay, fire-clay, potters-clay, porcelain-clay, and ball-clay. All these clays contain plastic elements in a much more marked degree than other aluminous minerals, and are generally grouped together in the book referred to. The "pitch," the residual product of tar distillation used in this invention, is the bulk product of the compound produced. The "aluminous matter" mentioned forms a comparatively very small proportion of the compound.

It is said that the product manufactured as described does not either crack in frosty weather or soften to the same extent in hot weather as ordinary soft pitch binders heretofore manufactured will do; also that when the heavy oils have never been volatilized they have a much stronger affinity for the pitch than when added as a flux. The product is therefore more stable; and in the manufacture of the pitch used it is preferable to arrest the distillation of the crude tar for asphalt work.

In order to facilitate the manipulation of this product for asphalte work, it is advisable in some cases to add a certain proportion of flux or diluting liquid, either to the treated pitch or to the sand or fillers forming the bulk of the asphalte in which the new product is applied. In this case, however, the greater quantity of oils left in the pitch as manufactured renders possible the use of a smaller quantity of the flux than is usually employed—the reduction in the quantity of the flux used, together with the previous addition of kaolin, resulting in less susceptibility to change of form under heat, "which is a new and useful end obtained." In fact, the combination of coal-tar pitch prepared as mentioned with kaolin free from gritty matter, for the uses described, in the manner described—producing a viscous product having great ductility—is said to be "an entirely new manufacture."

* Two subsequent patents have been taken out—No. 10,699 of May 8, 1907, and No. 11,498 of May 16, 1907.

## HIGH-PRESSURE GAS DISTRIBUTION.

At the last Annual Meeting of the South-Western Electrical and Gas Association, Mr. Harry M. Moore, the Manager of the Austin (Texas) Gaslight Company, read a paper on "High-Pressure Gas Distribution for Commercial Purposes." The following are some extracts from the paper.

My first experience with high-pressure gas distribution was in the small town of Sycamore (Ill.). The main plant was located in a neighbouring town six miles away, and a line of 4-inch pipe was laid from the main to the basement of the office in Sycamore, where was stationed a duplicate system of regulators by which the gas was passed to the low-pressure mains for general distribution over the town. Only the consumers along the 4-inch line were supplied directly by high pressure. On this main we carried a pressure of from 10 lbs. to 30 lbs., which would not have permitted direct connection without some means of reduction; so at each residence we installed a separate governor or regulator by which the pressure was reduced to about 3 inches of water, or about 0·1 lb. steam pressure. This regulator was so connected that should it any time fail to perform its duty and allow the full pressure to pass, there was no danger to the occupants of the house, as a seal would be blown, and the gas thereby turned into the air. Our service along this line was highly satisfactory, but occasionally a seal would blow, and a heavy leakage would have resulted unless promptly attended to. On the low-pressure mains, the service could not be excelled, as there was practically the same pressure at all times, no matter how large or how small the consumption. During the nine months that I was in charge at Sycamore our pressure did not vary more than 2-10ths except at one time when a 3-inch main broke in two.

At Austin I have lately put in a high-pressure booster line, and it has demonstrated to my mind that high pressure is the solution of our troubles from small mains. In the early days of the plant, the greater part of the main laid was 2 inch. The plant grew until it was practically out of the question to supply some parts of the city during the heavy load periods of the day; so we laid 2¼ miles of 4-inch pipe as a high-pressure distributing line, and installed four No. 4 Reynolds district governors and a Westinghouse compressor, by which means we have overcome our trouble and very materially reduced our distribution labour cost.

Much has been said and written about the heavy leakage caused by high pressure. No doubt this would be the case where the mains were not originally intended for such service and not properly tested. But I do not find that my leakage has been very greatly increased, and when the line is entirely completed, I do not expect it to be any heavier; for I am testing under 45 lbs., seeing that each joint is tight, while I shall carry only 15 lbs. to 20 lbs. when I am through testing. But I save the expense necessary for taking out the large quantity of 2-inch pipe, and replacing it with larger main.

Mr. G. F. Goodnow, one of the best authorities on high-pressure distribution, says: "A mile of 1¼-inch pipe at 25 lbs. initial pressure will deliver as much gas as a 4-inch cast-iron main at 25-10ths pressure; and a 2-inch pipe under similar conditions will deliver as much as a 6-inch. A computation shows that a 1¼-inch and a 4-inch pipe a mile long will deliver under these conditions about 3000 cubic feet per hour, and a 2-inch and a 6-inch about 9000 cubic feet per hour. With fifty services per mile, the cost would be $2362 for the 4-inch pipe and $1317 for the 1¼-inch pipe." This shows what a great saving can be accomplished by high-pressure distribution. In the discussion on Mr. Goodnow's paper, much scepticism was shown; but to-day the most sceptical has become convinced that high-pressure gas-distribution is both efficient and economical, and that the old claim that there was a large loss of candle power caused by compression has not shown up in practice. Prior to the date of Mr. Goodnow's paper, I was furnishing gas with both high and low pressure in Sycamore (Ill.) with equally satisfactory results. I might cite many instances of the successful operation of high-pressure plants; but that of the North Shore Gas Company which supplies the part of the Illinois shore of Lake Michigan from Evanston to Waukegan, is sufficient. In the list of ten or twelve suburban towns on its line, all but one or two have nothing but high pressure, and all are being served excellently. For boosting low-pressure mains, high pressure is the most logical means that can be adopted; and, taken all in all, I am thoroughly convinced high-pressure distribution can be safely adopted for commercial purposes.

# RESEARCHES ON THE CARBONIZATION OF TYPICAL ENGLISH COALS.

By Professor E. J. CONSTAM and Herr E. A. KOLBE, of Zürich.

A communication to the "Journal für Gasbeleuchtung" of the 4th inst. gives the results of researches made at the Federal Fuel-Testing Laboratory at Zürich on the carbonization of a few typical English coals. It is supplementary to the reports of similar researches made by Professor Constam in collaboration first with Herr Schläpfer, and subsequently with Herr Kolbe, on typical German and French coals.*

The earlier researches demonstrated that the combustible substance of coals containing from 18 to 22 per cent. of volatile matter and of true anthracite had the highest calorific power. Chemical and calorific tests of a large number of samples of coal which Professor Constam collected in the course of a tour of English coal mines did not forthwith show agreement with this law; and it was therefore decided to make carbonizing trials of eight of these samples in the retort which had been used for the earlier series of researches. The relation between these small-scale trials and carbonization on a large scale was established by carbonizing also, in the small experimental plant, an English coal ("Kinneil") which had been exhaustively studied in the large scale plant at the Zürich Gas-Works.

Table I. gives the chief analytical results for the nine varieties of English coal examined.

It will be seen from the table that coals Nos. II., III., and IV. yielded practically the same percentages of coke, and, consequently, of volatile matter, in the retort trials; nevertheless the heats of combustion of these coals differed by over 500 B.Th.U.

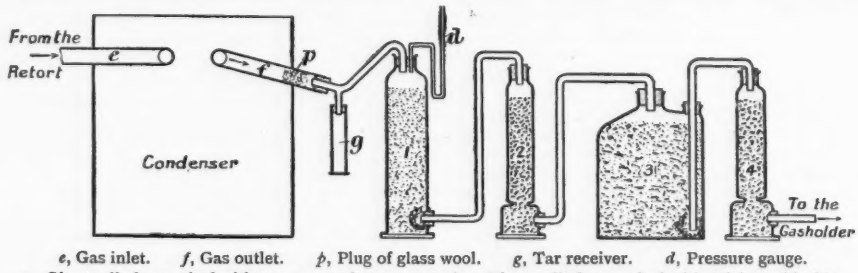
TABLE I.—*Composition and Calorific Value of the Coals.*

| Description of Coal. | Moisture. | Ash. | Composition and Properties of the Coal Substance—(*i.e.*, the Coal Free from Water and Ash). | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Carbon. | Hydrogen. | Oxygen. | Nitrogen. | Sulphur. | Yield of Coke. | | Available or Free Hydrogen per 1000 Parts of Carbon. | Gross Heat of Combustion. | Net Calorific Power. |
| | | | | | | | | In Experimental Retort. | In Platinum Crucible. | | | |
| | Per Cent. | Per Cent. | Per Cent. | Per Cent. | Per Cent. | Per Cent. | Per Cent. | Per Cent. | Per Cent. | | B.Th.U. per Lb. | B.Th.U. per Lb. |
| I. Nottingham, bright coal | 9·60 | 3·06 | 81·38 | 5·30 | 10·20 | 2·02 | 1·10 | 59·7 | 56·37 | 49 | 14,522 | 13,918 |
| II. Lancashire, Trencherbone | 2·58 | 1·42 | 84·85 | 5·38 | 7·05 | 1·87 | 0·85 | 63·1 | 60·04 | 53 | 15,124 | 14,602 |
| III. Nottingham, best hard | 7·50 | 3·36 | 83·15 | 4·97 | 9·24 | 2·03 | 0·61 | 63·2 | 60·40 | 46 | 14,555 | 14,072 |
| IV. Kinneil | 2·36 | 4·11 | 83·99 | 5·55 | 9·23 | | 1·23 | 63·7 | 61·60 | 55 | 15,032 | 14,494 |
| V. Durham, Low Main seam | 1·61 | 1·91 | 86·11 | 5·48 | 5·66 | 2·11 | 0·64 | 65·7 | 63·99 | 53 | 15,392 | 14,859 |
| VI. Durham, Hutton seam | 0·94 | 0·94 | 88·25 | 5·46 | 3·70 | 1·78 | 0·81 | 69·2 | 66·86 | 57 | 15,766 | 15,235 |
| VII. Yorkshire, Barnsley | 2·81 | 8·65 | 85·62 | 4·82 | 7·92 | 1·03 | 0·61 | 70·0 | 66·74 | 44 | 14,792 | 14,324 |
| VIII. Durham, Ballarat seam | 0·98 | 2·95 | 88·64 | 4·95 | 4·22 | 1·77 | 0·42 | 76·6 | 73·60 | 48 | 15,550 | 15,109 |
| IX. Welsh, Nixon's Navigation | 1·11 | 1·79 | 90·10 | 4·72 | 2·58 | 1·53 | 1·07 | 80·9 | 78·48 | 48 | 15,730 | 15,271 |

Similarly, the yields of coke of coals Nos. VI. and VII. were practically the same, yet the heats of combustion differed by about 900 B.Th.U. It will be shown that the cause of this divergence lies in the different composition and the resultant different calorific value of the volatile constituents of these coals. There is, however, a close relation between the heat of combustion of, and the proportion of carbon in, the combustible substance of the coals. The coals were purposely selected with but small differences in the amount of hydrogen contained in them, as an object of the trials was to clear up the cause of great differences in the heat of combustion of coals having the same proportion of volatile matter in them.

The carbonization tests were carried out in the same retort and at the same temperature as the earlier tests; but as the English coals were richer in gas and contained more water, a more effective condenser was provided. The gas circulated in the annular space between two water-cooled cones; the course of the gas being determined by deflecting plates or guides. The general arrangement of the apparatus is shown in fig. 1. A plug of glass wool (*p*) and a cylinder packed with sawdust were used to retain particles of tar. Actually the glass wool retained so much of the tar that the sawdust was only lightly coloured brown; and it served mainly to retain moisture. The rest of the moisture was removed from the gas by the calcium chloride. The increase in weight of the cylinders 1 and 2 was taken as a measure of the yield of tar and liquor. The purifier consisted of a two-necked bottle, charged with a mixture of sawdust and new oxide. The final cylinder of calcium chloride served to retain moisture taken up by the gas from the purifier. The increase in weight of 3 and 4 together was taken as the weight of sulphur compounds. The charges of half-a-kilogramme (1·1 lbs.) of coal were introduced in an iron container into the retort when it had been heated up to about 800-810° C. The gas from the first charge was in each case blown off into the open; being merely utilized to displace the air in the apparatus. The gas and other products from subsequent charges were collected and examined. The carbonizing temperature was maintained at about 810° to 830° C. The coke was not quenched with water, but was extinguished by shutting it up in an empty air-tight retort. The possible quantity of coke or carbon which could be consumed by this method of cooling is shown by calculation to be negligible.

Carbonization in the small retorts is distinguished from carbonization on the large scale by the fact that with the former the tarry and pitchy products escape from the short retorts as soon as they are formed. Owing to the shallower layer of coal, they cannot be partially condensed, whereas with large retorts a portion of the primary products of carbonization is condensed in the inner cold core, and there undergoes further decomposition. The yield of coke, therefore, falls somewhat lower on the small scale, and the yields of tar and pitch are higher. For instance, the yield of coke from Kinneil coal was about 2·7 per cent. lower in the small retort than in the large experimental plant at the Zürich Gas-Works, while the yield of tar was about 1·6 per cent. higher. The quantities of tar and liquor produced were determined in the same manner as in the earlier series of tests, and the chemical and calorimetric examinations were also made similarly. A summary of the results of the carbonization tests is given in Table II. They refer to the coal as tested, and not to the ash-free and dry coal substance.




*e*, Gas inlet. *f*, Gas outlet. *p*, Plug of glass wool. *g*, Tar receiver. *d*, Pressure gauge.
1. Glass cylinder packed with coarse sawdust. 2 and 4. Glass cylinders packed with calcium chloride.
3. Purifier charged with a mixture of sawdust and purifying material.

**Fig. 1.—Arrangement of the Apparatus for the Carbonization Trials.**

It will be seen from the results given in this table that the quantity of coke obtained varied from 60 to 81 per cent. of the weight of coal carbonized. The tar obtained varied from 2·5 to 10·2 per cent., and its specific gravity from 1·157 to 1·200; while the yield of gas ranged from 11·2 to 20·3 per cent. by weight. The yield of tar is higher than on the large scale, owing to the difference already referred to in the conditions of carbonization. When

* See "JOURNAL," Vol. CIII., p. 382.

TABLE II.—*Results of Carbonization Tests.*

| Description of Coal. | Coke Obtained in Retort. Average Yield. Per Cent. of Coal. | Average Yield of Gas Per Ton of Coal. Cubic Feet at 60° Fahr. and 30 ins. Saturated. | Specific Gravity of Gas. | Yields of Products. Per Cent. by Weight of Coal. | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Gas. | Tar. | Liquor. | Pitch (thick tar). | Sulphur Compounds. |
| I. Nottingham, bright coal | 55·2 | 11,886 | 0·463 | 18·5 | 6·7 | 17·9 | 1·4 | 0·3 |
| II. Lancashire, Trencherbone | 62·0 | 12,697 | 0·475 | 20·3 | 10·2 | 5·7 | 1·3 | 0·5 |
| III. Nottingham, best hard | 59·7 | 11,076 | 0·475 | 17·7 | 8·3 | 12·7 | 1·2 | 0·4 |
| IV. Kinneil | 63·7 | 11,964 | 0·462 | 18·5 | 8·6 | 6·8 | 2·0 | 0·4 |
| V. Durham, Low Main seam | 65·3 | 11,674 | 0·433 | 17·0 | 9·2 | 6·2 | 2·1 | 0·2 |
| VI. Durham, Hutton seam | 68·8 | 12,253 | 0·427 | 17·5 | 7·6 | 3·9 | 2·0 | 0·2 |
| VII. Yorkshire, Barnsley | 70·6 | 9,744 | 0·393 | 12·9 | 5·9 | 8·7 | 1·6 | 0·3 |
| VIII. Durham, Ballarat seam | 76·6 | 10,999 | 0·347 | 12·8 | 2·5 | 6·4 | 1·6 | 0·1 |
| IX. Welsh, Nixon's Navigation | 80·3 | 11,790 | 0·321 | 11·2 | 3·1 | 3·8 | 1·3 | 0·3 |

coal is distilled in large ovens or chambers, a portion of the primary products of distillation passes at first into the cold interior core of the charge; and as the heat gradually reaches the interior, these distillates undergo further decomposition. This condition obtains to a less degree in ordinary inclined and horizontal retorts than in coke-ovens, chamber carbonizers, and vertical retorts; hence the yield of tar is lower with the latter types. In the experimental retort, the layer of coal is so shallow that practically no condensation of the products can take place in it, and the yield of tar is therefore large. The whole of the gas from the charges in the experimental retort came off in 60 minutes. With the coals richest in gas—viz., Nos. I., II., III., IV., and VI.—the bulk of the gas was evolved in from 15 to 20 minutes after charging; whereas with the coals poorer in gas, such as Nos. V., VIII., and IX., the bulk of the gas was evolved 20 to 30 minutes after charging. Coal No. VII. (Barnsley) behaved abnormally in this respect, owing to the different composition of its volatile matter. Though a poor gas coal, the bulk of its gas was evolved in from 15 to 20 minutes. Thus the course of gasification varies according to the description of coal, though the temperature of carbonization is the same.

With the rich gas coals there is smaller chance of decomposition of the volatile constituents; hence the yield of tar is higher. With the poor gas coals there is more far-reaching decomposition of the resultant volatile products, owing to the more protracted evolution of them. The researches were intended to throw light on the yield and quality of the coke, as well as of the volatile products, at the same temperature of carbonization for all the coals. It was desired to compare the yield of coke in the small retort with the yield in testing coal with the crucible. The results of the examination of the coke produced in the experimental retort from the different coals are shown in Table III. The average composition of the coke substance—the ash and water-free coke—for all the descriptions is as follows: Carbon, 96·59 per cent.; hydrogen, 0·76 per cent.; oxygen and nitrogen, 1·91 per cent.; sulphur, 0·74 per cent. The mean heat of combustion works out at 14,443 B.Th.U. per lb., whereas the earlier series of researches showed for twelve French and one Spanish coal a mean of 14,463 B.Th.U. per lb.

The pitch or thick tar produced contained from 0·83 (Low Main and Ballarat coals) to 2·81 (Trencherbone coal) per cent. of ash. The net calorific power of the ash-free pitch ranged from 13,757 B.Th.U. per lb. for Nottingham best hard coal to 15,519 B.Th.U. for Ballarat seam coal; and the mean for all the coals was 14,870 B.Th.U. The variations in the proportion of carbon in, and the heat of combustion of the pitch obtained from, the coals follow closely the variations in the corresponding figures for the combustible matter of the different coals. This correspondence between the pitch obtained from, and the combustible matter of, the coals had been observed in the earlier series of investigations. The proportion of carbon in, and the heat of combustion of, the tar obtained decreased as the yield of coke from the coals increased. This is evident from the figures given in Table IV. The tar from the Hutton seam coal exhibits an exception to the general relation referred to above, in that its heat of combustion and its content of carbon are higher than those of tars from coals containing a greater proportion of volatile constituents. For this reason, among others, this coal has a higher heat of combustion than would be expected from its proportion of volatile matter.

Table V. shows the more important characteristics of the gas obtained from the coals. The figures are the mean of two trials. The abnormal behaviour of coals Nos. III. and VII. is explained by the different composition and low calorific power of the gas obtained from them. The heat of combustion of the gas from

TABLE III.—*Composition of the Retort-Made Coke.*

| Description of Coal. | Ash in Coke. Per Cent. | Moisture in Coke. Per Cent. | Percentage Composition of the Pure (Ash Free and Dry) Coke. | | | | Gross Heat of Combustion of the Pure Coke. B.Th.U. per Lb. | Net Calorific Power of the Pure Coke. B.Th.U. per Lb. |
|---|---|---|---|---|---|---|---|---|
| | | | Carbon. | Hydrogen. | Oxygen and Nitrogen. | Sulphur. | | |
| I. Nottingham, bright coal | 4·01 | 0.53 | 95·67 | 0·83 | 2·67 | 0·83 | 14,369 | 14,288 |
| II. Lancashire, Trencherbone | 3·11 | 0·34 | 97·19 | 0·70 | 1·38 | 0·73 | 14,357 | 14,288 |
| III. Nottingham, best hard | 5·65 | 0·55 | 96·26 | 0·77 | 2·54 | 0·43 | 14,328 | 14,251 |
| IV. Kinneil | 7·35 | 0·30 | 95·60 | 0·81 | 1·94 | 1·65 | 14,414 | 14,337 |
| V. Durham, Low Main seam | 3·65 | 0·13 | 96·01 | 0·84 | 2·44 | 0·71 | 14,476 | 14,393 |
| VI. Durham, Hutton seam | 1·68 | 0·23 | 96·39 | 0·91 | 2·01 | 0·69 | 14,459 | 14,371 |
| VII. Yorkshire, Barnsley | 12·21 | 0·31 | 97·03 | 0·89 | 1·65 | 0·43 | 14,501 | 14,414 |
| VIII. Durham, Ballarat seam | 4·01 | 0·28 | 97·16 | 0·87 | 1·43 | 0·54 | 14,571 | 14,486 |
| IX. Welsh, Nixon's Navigation | 3·04 | 0·22 | 97·13 | 0·72 | 1·04 | 1·11 | 14,548 | 14,476 |

coal No. VI., on the other hand, is high; and this, in conjunction with the high heat of combustion of its tar, explains why its heat of combustion is high relatively to its proportion of volatile matter.

From the figures arrived at in the investigations, heat-balances have been drawn up for the carbonization of the different coals. For the coal substance (*i.e.*, dry and ash-free coal) these are shown graphically in fig. 2. Table VI. also gives the proportions of the total heat of the original coal substance which are found in each of the products of distillation and the loss of heat in the process. The figures are percentages of the total calorific power of the coal substance. In the diagram (fig. 2), the abscissæ signify yields of coke and the ordinates calorific powers in B.Th.U.'s per lb.

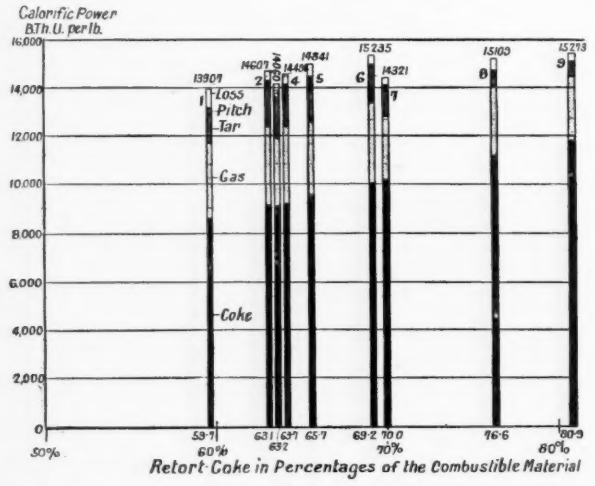
TABLE IV.—*Yield and Properties of the Tar.*

| Description of Coal. | Yield of Tar in Percentages of the Dry and Ash-Free Coal. | Specific Gravity of Tar. | Ash in Tar. | Carbon in Tar. Per Cent. | Net Calorific Power of Tar. B.Th.U. per Lb. |
|---|---|---|---|---|---|
| I. Nottingham, bright | 7·7 | 1·165 | Traces | 87·34 | 15,152 |
| II. Lancashire, Trencherbone | 10·6 | 1·190 | ,, | 88·13 | 15,151 |
| III. Nottingham, best hard | 9·3 | 1·168 | ,, | 86·75 | 15,179 |
| IV. Kinneil | 9·2 | 1·163 | ,, | 85·34 | 14,974 |
| V. Durham, Low Main | 9·5 | 1·170 | ,, | 85·45 | 14,841 |
| VI. ,, Hutton | 7·7 | 1·200 | ,, | 87·24 | 15,228 |
| VII. Yorkshire, Barnsley | 6·7 | 1·157 | 0·10 p.ct. | 84·16 | 14,720 |
| VIII. Durham, Ballarat | 2·6 | 1·161 | Traces | 82·83 | 14,413 |
| IX. Welsh, Nixon's Navigation | 3·2 | 1·160 | ,, | 79·70 | 13,860 |

It was shown in the earlier communication that for the coals then under consideration the highest gross heat of combustion or net calorific power was found with those varieties which contained from 18 to 22 per cent. of volatile matter, and with the true anthracites. The series of coals now examined, however, exhibits numerous exceptions to this rule. These exceptions are due to the fact that the chemical composition and the heat of combustion of the volatile constituents are not always functions of their amount. Very special stress must be laid upon this observation, because Goutal has proposed an empirical formula for calculating the heats of combustion of coals from the proportions of fixed carbon and volatile matter in them. This formula assumes that the heat of combustion of the pure coke from different coals is constant, and that the heat of combustion of the volatile matter is dependent on its amount. The first assumption rests on facts; and Goutal's formula gives useful approximate values in many cases, because in the majority of instances the second assumption, of a relation between the heat of combustion of the volatile constituents and their amount, is also correct. In a number of cases, however, the latter assumption is untenable, as Streit showed in

TABLE V.—*Composition and Quality of the Gas.*

| Description of Coal. | Mean Specific Gravity of Gas. | Illuminating Power in Slit Burner. English Candles per 5·3 Cub. Ft. per Hour. | Gross Heat of Combustion. B.Th.U. per Cub. Ft. | Net Calorific Power. B.Th.U. per Cub. Ft. | Mean Composition of the Gas in Percentages by Volume. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Carbonic Acid. | Heavy Hydrocarbons | Oxygen. | Carbonic Oxide. | Methane. | Hydrogen. | Nitrogen. |
| I. Nottingham, bright coal | 0·463 | 7·1 | 576 | 517 | 2·90 | 5·25 | 0·75 | 7·45 | 25·35 | 54·66 | 3·64 |
| II. Lancashire, Trencherbone | 0·475 | 10·2 | 611 | 559 | 2·20 | 7·60 | 0·60 | 9·77 | 28·94 | 48·08 | 2·81 |
| III. Nottingham, best hard | 0·475 | 6·5 | 569 | 509 | 4·15 | 5·55 | 0·90 | 11·49 | 24·27 | 49·62 | 4·02 |
| IV. Kinneil | 0·462 | 9·1 | 619 | 554 | 2·30 | 5·90 | 0·50 | 8·50 | 29·40 | 50·20 | 3·20 |
| V. Durham, Low Main seam | 0·433 | 10·0 | 627 | 564 | 1·70 | 6·20 | 0·75 | 5·02 | 32·43 | 50·70 | 3·20 |
| VI. Durham, Hutton seam | 0·427 | 9·9 | 647 | 586 | 0·90 | 5·85 | 1·00 | 3·62 | 31·20 | 51·43 | 6·00 |
| VII. Yorkshire, Barnsley seam | 0·393 | 6·2 | 589 | 531 | 3·50 | 5·70 | 0 80 | 8·27 | 24·80 | 51·98 | 4 95 |
| VIII. Durham, Ballarat seam | 0·347 | 6·5 | 609 | 547 | 1·30 | 4·45 | 0·75 | 2·94 | 29·78 | 56·10 | 4·68 |
| IX. Welsh, Nixon's Navigation | 0·321 | 2·6 | 538 | 475 | 1 00 | 2·65 | 0·80 | 4·13 | 24·08 | 63·04 | 4·30 |




COALS:

1. Nottinghamshire: Bright Coal.
2. Lancashire: Trencherbone Coal.
3. Nottinghamshire: Best Hard Coal.
4. Kinneil Coal.
5. Durham: Low Main Seam.
6. Durham: Hutton Seam.
7. Yorkshire: Barnsley Seam.
8. Durham: Ballarat Seam.
9. Wales: Nixon's Nr. 3 Rhondda Vein.

**Fig. 2.—Heat-Balance of the Distillation of English Coals on the Basis of the Ash-Free and Dry Coal Substance.**

TABLE VI.—*Heat-Balance of Carbonization.*

| Description of Coal. | Heat Found in | | | | Loss of Heat. |
|---|---|---|---|---|---|
| | Coke. | Gas | Tar. | Pitch. | |
| I. Nottingham, bright coal | 61·3 | 22·7 | 8·4 | 1·6 | 6 0 |
| II. Lancashire, Trencherbone | 61·7 | 22·8 | 11·0 | 1 4 | 3·1 |
| III. Nottingham, best hard | 64·1 | 20·2 | 10·0 | 1·3 | 4·4 |
| IV. Kinneil | 62·9 | 22·0 | 9 5 | 2 1 | 3·5 |
| V. Durham, Low Main seam | 63 7 | 20·6 | 9 5 | 2·2 | 4·0 |
| VI. ,, Hutton ,, | 65·3 | 22·1 | 7·7 | 2·0 | 2·9 |
| VII. Yorkshire, Barnsley ,, | 70·4 | 18·3 | 6·9 | 1·9 | 2·5 |
| VIII. Durham, Ballarat ,, | 73·6 | 18·6 | 2·5 | 1·7 | 3·6 |
| IX. Welsh, Nixon's Navigation | 76·7 | 16·9 | 2·9 | 1·4 | 2 1 |

1906 in a special dissertation. He took the view that no general formula applicable to all types of coal could be established for calculating the heat of combustion from the ultimate analysis, but that it might be possible to deduce a practicable formula for each type of coal separately. The present investigation shows that this also is improbable, and that, therefore, the only permissible method of ascertaining the heat of combustion or calorific power of solid fuels is a determination by the calorimeter. While the authors have found that the calculated calorific power of coals is more nearly correct the more accurate is the ultimate analysis of the coal on which it is based, they would point out again that it is much more difficult and more tedious to make an accurate ultimate analysis than to make a determination in the calorimeter.

[The authors record their thanks to Herr Weiss, the Engineer, and Dr. Ott, the Chemist, of the Zürich gas undertaking, for the use of apparatus for the investigation.]

**Eastern Counties Gas Managers' Association.**—We are informed by the Hon. Secretary (Mr. T. A. Guyatt) that the Hull meeting of the Association will take place on Thursday and Friday of next week (the 23rd and 24th inst.). The technical programme will include Mr. John Young's Presidential Address, and the discussion on Mr. W. J. Carpenter's paper, which was deferred at the last meeting. Full details will be notified later.

# MORE AMERICAN VIEWS ON COMMERCIALISM.

At the last Annual Meeting of the Illinois Gas Association, Mr. LUCIUS S. BIGELOW, the Publisher of the American journal "Light," read a paper on "Commercialism," from which we make the following extracts.

We can find all the way through history the visible manifestations of commercialism. The diplomat is a commercial man; for it is through his efforts, in many instances, that trade is created and remains undisturbed between countries. The engineer is, in a sense, a commercial man, because his endeavours are aimed at the production of that which, when disposed of, shall bring a return. It is quite possible, one can see, that an engineer may be a commercial man; but I think it would be difficult to point out how the purely commercial man could be considered as an engineer, unless of the special sort that has come into view during these later days—namely, the "business engineer."

"Commercialism" is indeed an exceedingly broad term, and might be considered as covering everything, from the chopping of the tree, the tilling of the soil and the growing of wool, to the selling of the finished product; or from the boring of the well to the operations of producing light, heat, and power from the products of the well; or from the mining of the coal and the ore to the finished piece of mechanism. In fact, we might go back to our citing of the "engineer," and state that he who surveys the land or who drafts the design is the man with whom commercialism in these days originates; but to bring this broad term into the scope of "gas commercialism" shall be the object of this paper.

At the last meeting of the Canadian Gas Association in Toronto, having been called upon to address that body on the subject of "gas commercialism," I pointed out how the manufacturer of appliances, through the mediums by which gas is converted into light, heat, and power, is the Alpha, while the commercial man of the gas company and the merchant who sells gas appliances may be looked upon as the Omega of gas commercialism; and certain it is that the one would be incomplete without the other. Therefore my deduction would be that, as each is of equal importance to the general gas enterprise, each should receive a like measure of consideration by the industry.

I have for a long period felt that the value of the manufacturer of gas appliances to the gas interests of the country has not been fully appreciated. In fact, I do not believe that the ability of the appliance manufacturer and the value of that ability to the gas man and to the gas industry have as yet been fully comprehended by many a gas man. It was a great pleasure to me, in promoting the organization of a gas association along strictly commercial lines, to have the appliance man recognized equally with the gas man in the membership. It was one of my suggestions that this should be done, believing fully that such an organization should stand for breadth, not narrowness—for the broadest commercialism, in its purpose of bringing together the three outlet sections of the gas industry, which are the manufacturer of appliances, the commercial gas man, and the merchant who handles gas appliances.

In regard to this last-named class of men, I believe that it will be of great benefit to the industry at large if the merchant can be generally brought into closer touch with these two other bodies of men in the industry, and thereby a better understanding be created between the manufacturer of appliances, the merchant, and the gas man. Though there are many who feel that the successful gas man will never relinquish to the merchant the handling of the sales field of appliances, I am not at all convinced personally that the time will not come when the commercial departments of a large number of gas companies will need to seek the close co-operation of the merchants. This does not say that certain trade is not already so conducted, nor does it say that some gas companies, having tried the plan of interesting the merchant, have found it a success as they conducted it. Nor does the fact that some gas companies have sought co-operation on the part of the merchant and have failed in arriving at a successful issue indicate to me that the plan is a general failure; for certain it is that some men will make a success where others fail, and perhaps the company who have not made a success of the plan might have done

so had the matter been handled differently, or had the time been more nearly ripe for it.

In a talk recently with one who is enthusiastic over the desirability of a technical education, I argued that without a very strong mixture of thorough commercialism it would result in his drawing $8 a week his entire life, while a combination of the two might be expected to equip him for a much better position. And yet specializing seems to be the order of the day; and so it was that in 1905 I suggested that the gas industry should specialize in a more complete manner than it had done in the past, and that there should be a recognized commercial side to the industry, and a representative of that division in the form of a Commercial Gas Association, as the other (the engineering) side was then predominantly represented by several Associations largely technical in their composition. Yet I would suggest that there is a possibility of too much of the element of specializing running in the veins of some people. For instance, the man who would study engineering without studying commercialism, as I have said, will usually only get about so far; and there he will stay. Let our engineering and our commercial gas associations keep in close touch. The danger referred to is less to be feared in the commercial field; for the same underlying fundamental principles which make a man a successful commercial man in, for instance, the machine field, will incline to make him successful in the gas or any other field. The man who has educated and trained himself up to the point of being a successful commercial man can easily adapt himself to almost any commercial field. Therefore it would seem to me that the men who have adopted commercialism in the gas field may, if successful there, look upon themselves as candidates for positions in any commercial field; whereas, the man who gives himself up solely to a profession must, as a rule, follow that profession, or else his earning power is gone.

Professions are necessary. However, I, for one, am perfectly willing that another should be a doctor, another a lawyer, and another an engineer; but give me commercialism. There is an enthusiasm about it that can hardly find a counterpart in any profession. The conduct of a business is like the playing of a game of chess. Unfortunately, however, only too frequently men overstep the bounds, and, in their endeavour to win the game, they forget the golden rule. Whatever others may say, I am as firm in the belief to-day as when I first had the motto given me that the keynote of true and lasting success is "Do unto others as you would they should do unto you." Unfortunately, this motto has been cartooned, as it were, and by many is looked upon as one of the sayings of childhood. But I tell you that in a vast number of cases where concerns have eaten up others this could have been avoided if men had used their ingenuity to discover new fields, or new branches in old fields, in which to build up and develop their energies. It is a misfortune that men are inclined to be copyists. A man brings out a good lamp, an arc, or an improvement in a range, and another man copies it. And so it goes on, instead of each exercising inventive genius and imagination, which if properly used would lessen the number of copyists, and would increase the number of devices created and perfected and of fields entered and won.

Commercialism is in every sense as high a type of occupation as ever was a profession. In fact, the commercial man who is honourable, straightforward, and in for the "square deal" only, is, in a sense, a stronger type of man than a purely professional man who follows along a beaten trail. In my opinion, temptation to crookedness is greater in the field of commercial men than in that of the engineer or of others who come in less frequent touch with the world of competition; and I believe, as a rule, the commercial man is a keener one than the professional man, by force of conditions. So to me commercialism ranks with the foremost occupations; and whether in the realm of Association work or every-day endeavour, my efforts will be for its advancement.

## Tar Road-Surfacing and River Purity.

The protective effects of the use of tar upon highways are too well established for the employment of tar for the purpose to be lightly disturbed. The Thames Conservators, however, are making complaint. Discharges of an objectionable character into rivers and streams from surface-water drains have been observed; and the Conservators state that they have been advised that the increasing use of oily and tarry substances for dust prevention will prove detrimental to the river and subsidiary streams. They have therefore requested the Councils concerned to take precautions accordingly. It may be suggested to the Conservators that the oily deposits from motor cars have a greater continuous effect than any use of tar. Tar quickly gives the road treated a good waterproof crust; and this early becomes so hard that it is impossible for any oily substance to be extracted from it by rain. And a gain to the surface water is that the coating also prevents the washing down of any part of the loose top surface, as is the case with an untreated road. The oily droppings from motor cars, on the other hand, are a perfect nuisance, and are responsible for much annoyance and injury to the clothes of pedestrians by the splashings of the liquid oily mud by passing horses. Take Fleet Street as an example. On a wet day, an oily film can always be detected on any puddles of water in the roadway, and on surface water flowing along the side gullies. The mud in our motor-traversed streets has at least one constituent more than it used to have; and the surface water contains additional pollution—neither being an improvement on the conditions of our streets.

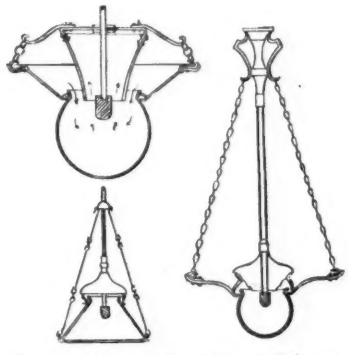
# REGISTER OF PATENTS.

## Gas Pendants and Burners.

HELPS, G., of Nuneaton.

No. 15,143; July 17, 1908.

This invention relates to a gas-pendant in which short chains or like flexible connections are attached to fixed points on the fitting; while a reflector or globe-holder or the like is detachably fixed to the other end of the chains.



Helps' Pendant for Incandescent Burners.

The illustration shows three forms of the fitting; and these are understandable without further description, except to point out that the patentee claims, in such a gas-pendant (in which the burner and the reflector or globe-holder or the like can swing relatively to each other) the attaching of guards to the burner or to the reflector or the like so that the burner or mantle is protected from damage.

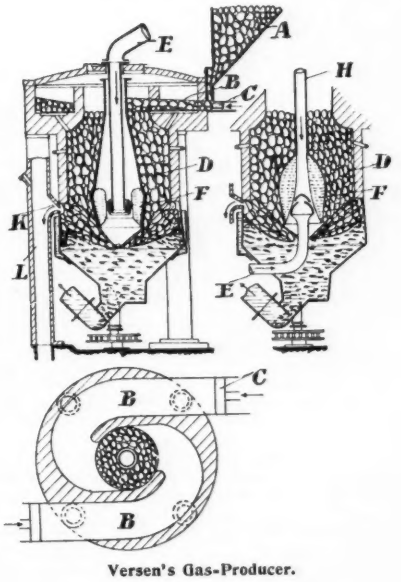
## Gas-Producers.

VERSEN, B., of Dortmund, Germany.

No. 16,610; Aug. 6, 1908.

This invention relates to gas-producers with a central air supply-pipe extending into the combustion zone and another pipe extending to the zone through which the gaseous products of distillation from the upper part of the producer are supplied.

In order to reduce the risk of the clinker blocking up the lower part of the producer-chamber, it has already been proposed (the patentee remarks) to give the producer-chamber at this part a conical form—the chamber widening downwards. According to this invention, the risk is still further reduced not only by adopting the conical form for the lower part of the producer-chamber, but also by giving a conical form to the part of the air and gas supplying means on the same level as the conical portion of the producer-chamber—the conical part narrowing downwards. By the provision of the conical surfaces, the clinker always slides downwards, and will not block up the producer-chamber by forming a bridge between the air and gas supplying means and the sides of the chamber. The air and gas supplying means are preferably water-cooled, and water is preferably provided in the bottom of the producer-chamber; the object being to break up the clinker on the latter falling into it.




Versen's Gas-Producer.

Referring to the first arrangement shown, A is the hopper which conducts the fuel to one of two tangential feed channels B, along which it is conveyed by pistons C to the upper part of the producer-chamber D. E is the central air-admission pipe surrounded by a casing, between which and the pipe E products of distillation pass from the top of the

producer-chamber down to conical nozzle-rings arranged at the bottom of the pipe. A portion of the lower part of the casing is provided with a cooling water-jacket F; and its lowermost portion is (in accordance with the main idea of the invention) made of conical shape—becoming narrower downwards. The portion of the wall of the producer-chamber which is level with the lowest portion of the casing is also conical, but widens downwards, and is provided with a cooling water-jacket. The clinker therefore must descend into the bottom portion of the producer-chamber, which contains water for the purpose of disintegrating the clinker and enabling it to be removed by any suitable means. The gas produced leaves the producer-chamber at K and passes into a hollow column L.

In the second form, the air supply-pipe E enters below and discharges air up against a hood, by which it is deflected downwards along an extension of the pipe H down which gaseous products of distillation flow from the upper part of the producer—the hood being arranged in the pipe with an annular space between the edge of the hood and the pipe. The lower part of the pipe and its extension are provided with a cooling water-jacket F, and the lower part of the outer wall of the jacket is conical and becomes narrower downwards. The opposite part of the wall of the producer-chamber is also conical, but becomes wider downwards.

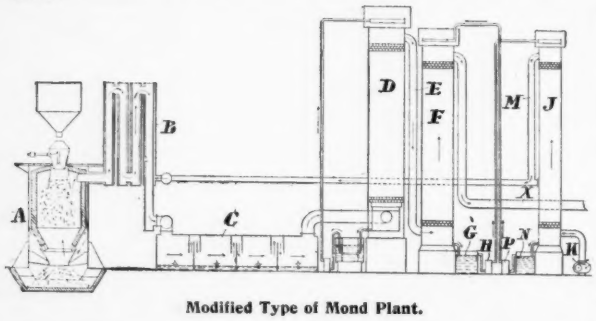
## Gas Producer Plants Primarily Designed for the Recovery of Ammonia.

CROSSLEY, W. J., and RIGBY, T., of Manchester.

No. 17,978; Aug. 27, 1908. Renumbered and re-dated—No. 11,890; May 20, 1909.

This invention has for its object "improvements in working the type of plant known as an ammonia recovery gas producer plant," and relates to the recovery of the heat of the vapours given off during evaporation and crystallization of the sulphate liquor.

The processes at present in use with such plants, the patentees point out, are primarily designed to work at low temperatures; and in consequence a considerable proportion of the original nitrogen contained in the fuel is recovered in the form of ammonia. In order to make such a process an economic success, it is found necessary in practice to cool the gases leaving the gas producer to such a temperature that a great proportion of the sensible heat of the gases and the sensible and latent heat of the steam present in the gases is recovered. A portion of the sensible heat is recovered by superheating the air and steam on their way to the gas producers. To recover the greater portion of the remainder of the heat, it is usual to cool the gases and condense the water vapour present in them by means of circulating water or liquor, and which heat is afterwards recovered by regeneration in an air-saturating tower.



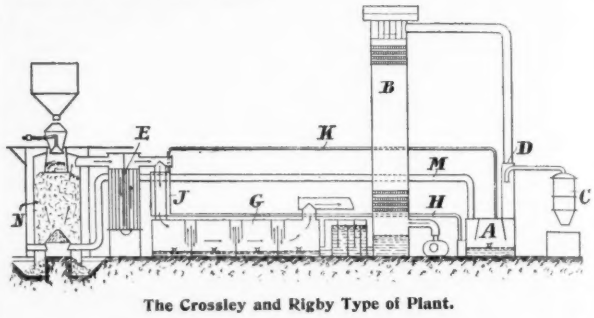

**Modified Type of Mond Plant.**

A diagram of the Mond type of plant is given first. The gases produced in A are passed through the superheater B before entrance into the mechanical washer C. In the washer they are cooled by water spray and freed from the dust they usually contain—leaving the washer at a temperature approximately 90° C. The gases are then passed through an acid tower D, where ascending through chequer work they are met by a stream of sulphate liquor containing free sulphuric acid in its composition, to absorb the ammonia present in the gases. Leaving the acid tower comparatively free from ammonia, the gases descend, by way of the pipe E, to the foot of the tower F, the function of which is to cool the gas to a still lower temperature and condense most of the water vapour present. This is effected by water, which is pumped up and circulated down the tower F through chequer work and in the opposite direction to the ascending gases. Leaving the tower F, the gases are usually taken away through a pipe X directly for use if intended for heating purposes, or are subjected to further cooling and purification if they are to be used in gas-engines. The water leaving the foot of the tower F in a heated condition passes into the tank G, whence it is pumped by the pump H to the top of the third tower J (known as the air-saturating tower), where, descending through chequer-work, it is met by air from the blower K on its way to the gas producers, and the intimate contact obtained causes the water to be cooled and the air to be heated and fully saturated with water vapour at the temperature it leaves the tower. The saturated air is then passed by way of the pipe M to the superheaters and gas producers, while the water leaving the foot of the tower J passes into the tank N, and is re-circulated by the pump P through the gas-cooling tower F. These interchanges of heat take place continuously.

An improved system was brought out by the present applicants (No. 24,144 of 1906), which mainly consists in washing and cooling the gases, condensing the water vapour, and absorbing the ammonia in one and the same apparatus. In addition to this, the actual sulphate liquor circulated is used for the purpose of simultaneously saturating the air with water vapour in the air-saturating tower, and simultaneously this action cools the liquor sufficiently for it to be used for re-circulation through the washing, condensing, and absorbing apparatus. By this means, a considerable reduction in the number of parts is made.

It is usual, it is mentioned, with both types of plant to keep the sulphate liquor in circulation at a strength of from 30° to 40° Twaddel. It is afterwards concentrated further in evaporating-pans for the purpose of crystallization of the sulphate in the marketable form; the mother liquor drained from the crystals being passed again into the sulphate liquor for circulation. While this evaporation is taking place in the pans, the vapours of evaporation are usually wasted; but in this invention they are treated in such a manner that they are recovered and passed into the gas producers as a portion of the auxiliary steam usually required.

The method found most practicable and is preferred is one where the vapours are arranged to saturate air intended for the gas producer before being washed by a suitable alkaline solution in order to neutralize any acids present in the vapours.




**The Crossley and Rigby Type of Plant.**

In the second illustration an alkaline washer A is used for the purpose of removing the acids contained in the vapours from the evaporating-pan C; and this is done by passing the vapours into the air-main D, conveying the saturated air from the air-saturating tower B—the mixture being washed by a heated alkaline solution in one and the same apparatus A. The alkaline solution in the washer is kept heated by any suitable means; but it is preferred to arrange that the liquor be circulated through a jacket J on the gas-outlet pipe from the superheater E and before entrance to the ammonia absorbing apparatus G. The liquor passes by means of the pipe H to the heating device J; the heated liquor being conveyed back to the washer by the pipe K. It will also be seen that the air leaves the washer by the pipe M, being thence conveyed direct to the superheater E, and so on to the gas producer N. The alkaline solution is usually heated at or above the temperature of saturation in such an arrangement so that condensation of vapour in the pipe M is reduced to a minimum.

It is found that with the present arrangement the air for the producers, instead of being saturated at about 73° C. as is usual from an air-saturating tower, is now saturated at nearly 80° C., without the addition of any steam from an auxiliary boiler.

## Incandescent Gas-Mantles.

LAYTON-FISK, J. W., of Cardiff.

No. 4860; Feb. 27, 1909.

The purpose of this invention is "to reinforce the ordinary makes of incandescent mantles . . . so as to render them proof, within the limits determined by the nature of the article, against vibration."

For this purpose the inventor melts silica with twice its weight of potassium silicate in solution, or, as an equivalent for the latter, with sodium silicate in solution, and dilutes the mixture with distilled water. He then takes a mantle of ordinary form and make, and dips it in the solution. After immersion, the mantle is first dried and then placed over a bunsen flame. He makes a mechanical mixture of highly pulverized refined talc, and "muschelkalk" limestone, in the proportions of 75 parts of the former to 25 parts of the latter ingredient in 100 parts. The mantle, while still warm from the effects of the bunsen flame, is sprayed with the mixture in a dry condition. The treatment is said to add considerable strength to the incandescent mantle, "making it much more durable than the mantle not so treated."

## Automatic Gas Lighting and Extinguishing Apparatus.

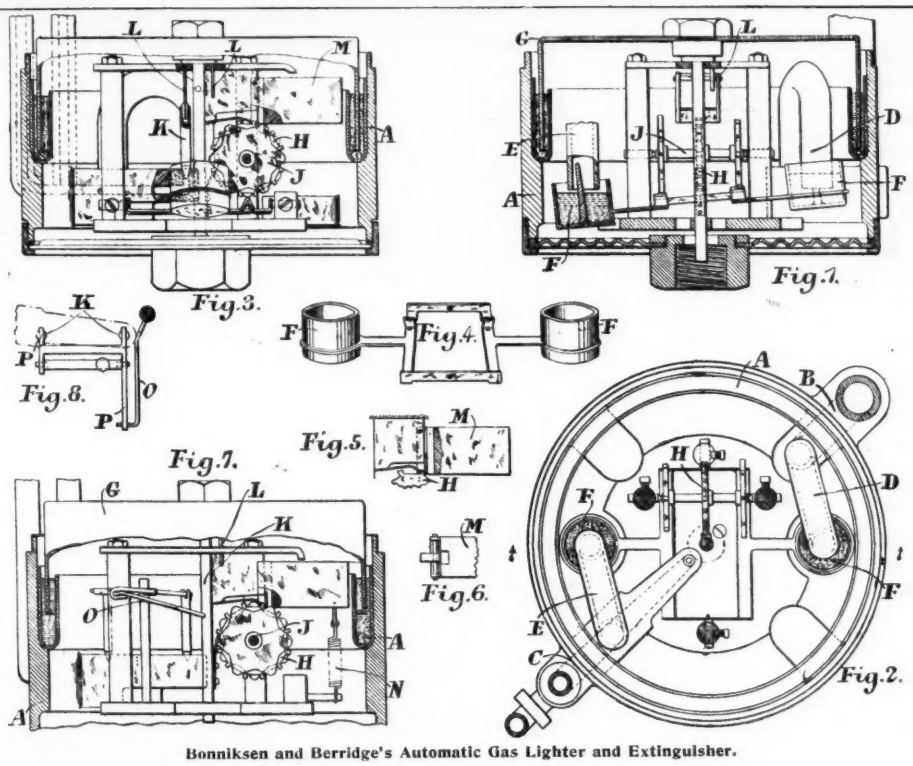
BONNIKSEN, B., of Coventry, and BERRIDGE, T., of Leamington.

No. 20,348; Sept. 28, 1908.

This gas lighting and extinguishing apparatus is of the type described in patent No. 12,619 of 1907, in which mechanism is contained in a gas-chamber with which communicate two pipes, one leading to the burner, and the other to the pilot. The operating mechanism consists in a rocker carrying mercury cups, adapted to rock and cover or uncover the two pipes alternately under the influence of a small increase in pressure, according to requirements.

The present invention provides an "improved construction in which the necessity for a permanently open small bye-pass is dispensed with, although without disadvantages arising therefrom;" a further object being to provide means for ensuring the mechanism against accidental movement due to slight fluctuations in pressure.

The mechanism is contained in a chamber (in communication with the gas supply) in the side of which are two passages opposite to one another. The passage B communicates with the burner, and the other C with the pilot-jet. Communicating with the passages are pipes D and E, which are bent over into inverted U form; and underneath these lie cups F containing mercury, carried upon the opposite ends of a rocker or see-saw. Adapted to move vertically is a gas-bell G or diaphragm, so fixed to a spindle that it moves vertically under increase of pressure in the mains. The spindle actuates, by means of the wheel




Bonniksen and Berridge's Automatic Gas Lighter and Extinguisher.

H, a cam-shaft J or the equivalent, positively tilting the rocker by means of the cams; so that for one increase in pressure by the partial rotation of the shaft J the pipe E and passage C to the pilot are opened and the main burner extinguished, the next increase of pressure in the mains tilting the rocker under the influence of the cams and causing a reversal to take place—the gas-burner being lighted and the pilot extinguished in the well-known manner.

The mechanism so far described (forming no part of the invention) is only used to demonstrate the application of the invention to mechanism of this type.

As has hitherto been pointed out, however, the pilot may be accidentally extinguished before the burner is lighted; so that a separate gas-way must be provided to supply the pilot for a short time and ensure the lighting of the burner. The pilot passage C, formed in the wall of the chamber, is therefore extended and provided with a conical valve seat, with which co-operates a needle valve K carried by a vertically moving spindle. Thus directly the spindle moves vertically, under the influence of the increased pressure, the valve K is opened and a sufficient supply of gas to the pilot is ensured. Preferably the needle valve K is freely mounted on, or pivotally suspended from, the spindle, or one of the depending guides L thereon, so that it is free to centre itself in the valve-seat and ensure correct seating. For instance, the needle valve may be weighted and be suspended from one of the guiding pins L of the spindle by means of a cross pin on the pin engaging a transverse hole in the valve, as shown. This hole is preferably slightly larger than the cross pin, so that latitude is provided in all directions—ensuring accurate seating of the valve.

In previous constructions, it has been found that any slight fluctuation in pressure causes accidental movement of the mechanism. To obviate this, it is proposed to so suspend a weight M that it rests in front of a tooth of the driving wheel H of the mechanism, necessitating the driving wheel raising the weight at each action of the mechanism. By this means accidental movement of the mechanism is prevented. The weight may be provided with a spring N as in fig. 7.

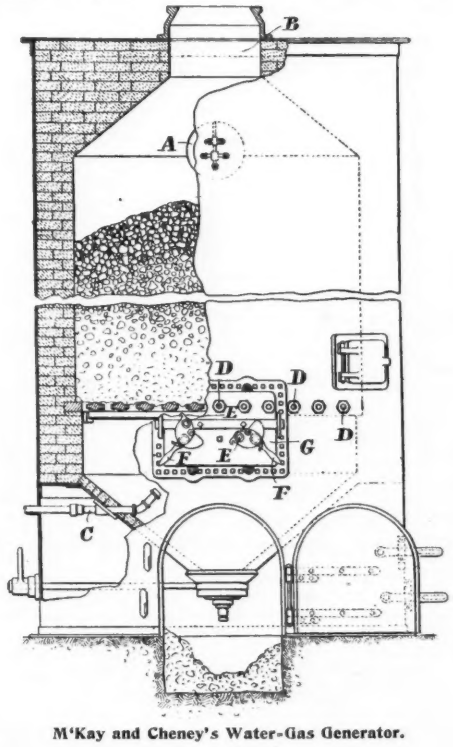
In some cases it is desirable that the bell G should stay at the top until it is desired to work the mechanism. In this case, it is necessary that the valve K should move in the opposite direction to the gas-bell G and its spindle. It is necessary therefore to introduce a lever between the valve and the spindle, so as to reverse the motion. Figs. 7 and 8 show how this may be effected. Projecting from the spindle is an arm O, which engages one end of a lever P carrying at its other end a valve K. There may, if desired, be two valves mounted on the same lever P. When, therefore, the gas pressure is decreased, the gas-bell and the spindle drop, raising the valves.

## Water-Gas Generators.

M'Kay, W. E., of Norfolk, and Cheney, H. N., of Boston, U.S.A.

No. 4973; March 1, 1909. Date claimed under International Convention, Nov. 11, 1908.

This invention has for its object "to provide a water-gas generator adapted to continuously carry on recurrent process of generating water gas by the combination of the component elements of steam with incandescent coal or similar fuel." A water-gas generator of ordinary construction, the patentees remark, so far as the means for combining the elements with the fuel are concerned, is employed, and is also provided with a grate having movable bars, which are operable from the exterior of the generator; so that the base portion of the bed of fuel may be cleaned by suitably moving the grate-bars. The main feature of novelty of the present invention consists in providing such a generator with gas-tight sight openings below the grate, and arranged in such relation to the grate-bar operating means as to permit the gas-maker to ascertain the condition of the base portion of the fuel-bed while it is being cleaned—the gas-maker being, therefore, guided, so that he is enabled to determine when the fire has been cleaned to the proper extent, and thus avoid "such an excessive cleaning of the fire as would involve waste of fuel and injurious or destructive heating of the grate-bars."



M'Kay and Cheney's Water-Gas Generator.

The bottom of the water-gas generator is provided with a gas outlet and steam-inlet A, and a fuel-inlet B. C is a steam-conduit entering the lower or ash-pit portion of the generator below the grate. Air under pressure is supplied through an opening (not shown) below the grate; and there is also a gas-outlet (not shown) below the grate. The generator grate is composed of a plurality of movable bars adapted to be operated to shake down ashes and clinker from the base portion of the bed of fuel supported by the grate—means being provided whereby an attendant is enabled to move the grate-bars to clean the base portion of the bed in such a way as to prevent the escape of air or gas from the generator. Each grate-bar is provided with an individual operating member—a shank D having a squared inner end engaged with a socket in one end of the grate-bar, and a squared outer end adapted to be engaged by a crank or handle. This operating member passes through

a stuffing-box affixed to the wall of the generator, and adapted to prevent the escape of air or gas around the operating member. Each grate-bar preferably includes a cylindrical body portion which rests, and is adapted to turn on fixed supporting bars and wings projecting from opposite sides and separated by spaces which coincide with the supporting bars, so that the grate-bars may be rocked on the supporting bars without interference between the wings and the supporting bars. This construction permits each grate-bar to be independently operated, so as to be manipulated to any extent required by the condition of the fuel bed immediately above it.

It is highly desirable, and, in fact, essential (the patentees say), that the grate-bars be operated in such manner that the base of the fuel bed will be cleaned neither too much nor too little—an excessive cleaning of the base of the bed resulting in waste of fuel and a destructive heating of the grate-bars, while an inadequate cleaning impairs the efficiency of the operation. To enable the exact condition of the base portion of the bed to be ascertained by the gas-maker, sight openings extend through the wall of the generator below the grate in such position that the gas-maker is enabled, while the grate-bars are being manipulated, to conveniently inspect the portion of the ash-pit immediately below the grate, and ascertain, by the condition of the matter escaping between the grate-bars, when the portion of the bed above each grate-bar has been suitably cleaned. The sight openings have means for preventing the escape of air or gas from the interior of the generator.

Each sight opening includes a tube inserted in an opening formed in the wall of the generator below the grate, and a light of glass or other transparent material E adapted to fit the outer end of the tube and prevent the passage of air or gas. The transparent light is preferably mounted in a holder pivoted to a flange or head formed on the tube and provided with a handle F, so that it may be swung into position to bring the light into register with the tube when the sight opening is in use, and to move the light out of register with the tube and protect it from heat when the sight opening is not in use—a solid portion of the holder covering the sight opening when the holder is in the latter position.

Any number of sight openings may be employed—two being shown supported by a plate or cover G, which is detachably secured to the wall of the generator and covers an opening extending through the wall, partly above and partly below the grate.

The patentees close their specification by saying that they believe themselves to be the first to employ, in a water-gas generator having a grate composed of movable bars which are operable from the exterior of the generator without permitting escape of air or gas therefrom, one or more gas-tight sight openings located below the grate, and in such relation to the grate operating means as to enable the operator to conveniently inspect the portion of the generator immediately below the grate. These simple provisions, they say, make it entirely feasible and practicable to continuously carry on the recurrent process of generating water gas—a result which, so far as they are aware, has not before been successfully accomplished.

### Temperature Measuring Apparatus.

DARLING, C. R., of Plumstead, S.E.

No. 11,187; May 11, 1909.

This invention relates to apparatus for measuring temperatures by the thermo-electric method, which consists essentially in combining with a galvanometer a thermometer in such a manner as to compensate for the temperature of the cold junctions of the thermo-electric circuit, and so enable the actual temperature of the hot junctions to be automatically read off on the scale of the galvanometer.

It has been proposed to achieve this result by the automatic thermometric regulation of the indicating current—allowing for variations in the temperature of the cold junction. But according to this invention, the object is attained by utilizing the variations in temperature at the cold junctions to produce automatically a differential displacement of the galvanometer scale and pointer.

The inventor proposes that the scale of the galvanometer is made movable, and is actuated by the thermometer in such a manner that the temperature of the cold junctions, which are brought into proximity with the thermometer, is added to the normal indication of the galvanometer due to the difference in temperature between the hot and cold junctions. It then follows that when the circuit of the galvanometer is broken, the temperature indicated on the scale is that of the cold junctions.

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**Suicide by Gas at Plaistow.**—A married woman named Mary Dullaghan, aged 27, living at Plaistow, who had for some time suffered from severe pains in her head, was found by her husband sitting in a chair dead. All the gas-taps in the house had been turned on by her; but the prepayment meter had by that time ceased to pass gas.

**Whitchurch and the Ownership of the Gas-Works.**—A letter has been read to the members of the Whitchurch District Council, from Mr. J. Williams, the Secretary of the Gas Company, acknowledging the receipt of a resolution passed by the Council and a rough draft scheme for the purchase of the undertaking. The writer said, however, that the Directors could not recommend the shareholders to entertain the scheme, nor were they prepared to submit alternative proposals. In their opinion, the only course for the Council, if they are really desirous of acquiring the concern, is to adopt the usual method of applying for statutory powers for the purpose, when the terms and purchase-price would be fixed in accordance with such powers. Subsequently, Mr. Elison said he thought it would be generally regretted that the overtures of the Council had been abortive. As to the suggestion that the Council should apply for statutory powers, the Directors must know that such an application would entail heavy expenditure, and that in a compulsory sale the ratepayers would have to pay a high price for the works. He hoped a more equitable way would be found; and with this object in view, he proposed that a special meeting of the Council should be convened in committee, to consider what further steps should be taken. This was agreed to.

# CORRESPONDENCE.

*[We are not responsible for opinions expressed by Correspondents.]*

### Pre-Heating the Air Supply to Bunsen Burners.

SIR,—In the communication I sent you the other day regarding preheating the air supply for bunsen burners, and to which I am pleased to see you have given so excellent a place in this week's "JOURNAL," I have, unfortunately, to ask you to kindly correct in your next issue a very awkward typist's error which occurred in the copy, and which I fear is too important to let pass.

In the table of temperatures, the figure given for the mean temperature at top of oven, in the right-hand column, reads 249·7° C., whereas it should be 294·7° C.—a difference of 50° C., which is, of course, so very serious a discrepancy as to render the comparison otherwise practically useless, though in summarizing the results further on in the article I give the figure representing the difference (50°) between these figures in the right-hand and left-hand columns, which would clear the matter up to anyone going closely into the figures.

I am very sorry to trouble you; but I think you will agree that the correction is one which should be made.

*Essex Works, Birmingham, Sept.* 8, 1909. H. JAMES YATES.

### West Bromwich Electricity Undertaking.

SIR,—Permit me to point out an error in your "Electricity Supply Memoranda" of the current issue. You mention West Bromwich as being among the accounts exhibiting slender surpluses—viz., £988. The net profit or surplus for the year ending March 31 last was £2442. The figure £988 which you give was the balance of profit made during the previous year, which was carried to a special depreciation and development fund, after the allocation of £800 in relief of rates, and £250 for extensions. The charges for current are among the lowest in the country.

*Gas-Works, West Bromwich, Sept.* 8, 1909. HAROLD E. COPP.

[We sincerely regret the error to which Mr. Copp kindly calls attention. Our source of information was apparently not so reliable as that of our correspondent, who, in his position, has, of course, access to the full accounts. Though opposed, generally speaking, to the principle of municipal trading, particularly when it is carried on to the injury of ratepayers and private enterprise, there is no desire on our part to vilify by misrepresentation. Therefore, we are indebted to Mr. Copp for calling attention to the inaccuracy.—ED. J.G.L.]

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**High-Pressure Gas Lighting at Wolverhampton Skating Rink.**—Referring to a paragraph obtained from a local source, which appeared on p. 652 of last week's issue, on the subject of a high-pressure gas lighting installation at the Wolverhampton Skating Rink, a correspondent writes: "You state that the skating rink is lighted by 30 Graetzin lamps, each containing five burners, and consuming 25 cubic feet of gas per hour, giving a light of 600-candle power. Might I ask if there is not some mistake here? Twenty-four candle power per cubic foot of gas consumed, as represented by these figures, is indeed low efficiency."

# LEGAL INTELLIGENCE.

### THE BANKRUPTCY OF MR. CHARLES SCOTT-SNELL.

At the London Bankruptcy Court last Tuesday, the public examination was held, before Mr. Registrar Giffard, of Mr. Charles Scott-Snell, Civil Engineer, of Heathside, Ockham, and late of Fairstead, Arthur Road, Wimbledon. The statement of affairs filed by the debtor disclosed gross liabilities amounting to £13,588, of which £5588 was due to unsecured creditors. To partly secured creditors there was due £8000, the value of the security being returned at £5000; thus leaving a balance of £3000 to rank against the estate for dividend, and making the total liabilities expected to rank against the estate amount to £8588. The assets were *nil*. The debtor informed the Official Receiver that the receiving order was made on his own petition; and he had been adjudicated bankrupt. Though by profession a civil engineer, he had not practised as such since 1882. For the past 25 years, he had been entirely occupied in inventing and perfecting various appliances in connection with gas lighting, steam-boilers, and domestic utensils, the patents for which he had sold to various companies formed to work them. In all cases, the consideration for such sale had been shares in the various companies, which were now valueless, as the undertakings had not proved successful. Since 1903, he had to a great extent been dependent upon borrowed moneys. He had been pressed by creditors during the last five or six years; and upon being served with a writ by a creditor for money lent, he decided to file his petition. He alleged his bankruptcy to have been caused through the failure in 1903 of one of the companies in which he had a large number of shares. He had not kept any books of account; but proper books were kept in respect of the various companies with which he was connected. His unsecured liabilities were mainly in respect of borrowed moneys. The claim of the partly secured creditor was in respect of money advanced to develop the Fairstead Estate at Wimbledon; and the bank who advanced the money held deeds of the property and shares in various companies formed to work his patents. He paid £8000 for the Fairstead Estate; but at that time he considered he was worth £50,000. The Scott-Snell Company had a paid-up capital of £50,000; and he

thought this would be sufficient. A subsidiary company was also being formed in America at the time to work the Scott-Snell patents; and if it had proved successful, he would have been a wealthy man, instead of a bankrupt. The examination was closed.

## GAS COMPANY FINED FOR DISCONNECTING SUPPLY.

The Westhoughton Gas Company were, at the Bolton County Police Court, last Thursday, fined 40s. and costs for having, as alleged, illegally disconnected the supply of gas to the house of Robert Selfe, a superannuated policeman, residing in Wigan Road, Westhoughton.

Mr. A. F. Greenhalgh, in support of the case for Selfe, said that his client had been a gas consumer for over twenty years, and regularly paid his accounts as rendered. In the early part of this year the inspector for the Company reported that the meter had registered a consumption of 1600 cubic feet of gas for the quarter; but an account was rendered charging for a consumption of 2700 cubic feet. Selfe had an interview with the Manager to the Company, and offered to pay for the consumption of gas recorded by the meter. This offer was, however, refused; and on complainant declining to pay the larger sum asked for the Company stopped the supply.

It was submitted by Mr. Greenhalgh that the Company were only entitled to take the steps they had done if a consumer was in arrear with his payments or had not found security for payment. He also pointed out that a section of the Act provided that if any amount was in dispute, it had to be decided by two Justices of the Peace; but the Company had not adopted this course.

For the defence, evidence was tendered by the Company's officials that the meter at the house occupied by Selfe was out of order. It was also denied that he offered to pay anything prior to the gas being disconnected.

Mr. J. H. Hall, who represented the Company, at the conclusion of the proceedings applied to the Magistrates to state a case for the High Court. He said that the decision of the Bench to fine his clients was, under the circumstances, of far-reaching importance; and they might desire to carry the matter further.

After consultation, the Magistrates agreed to state a case.

## Water-Works, Lighting, and Power Investment Corporation.

On the application of a debenture holder, Mr. Justice Neville, sitting in the Vacation Court, has made an order for the appointment of a Receiver and Manager of the Water-Works, Lighting, and Power Investment Corporation, Limited, for a period of three months—subject to the plaintiff filing an affidavit that the debt was due.

## A Mantle Hawker in Trouble.

Last Thursday, at the Weston-super-Mare Police Court, Vincent Jones, who was stated to be connected with a well-known Cardiff family, was charged upon a warrant with obtaining 5s. by false pretences from Dr. George D. Grey, a Solicitor. Dr. Grey stated that when visiting a Mr. Bambridge, he saw the prisoner at the door in conversation with that gentleman, and exhibiting some incandescent mantles. Witness said to Mr. Bambridge, "You are buying some of these?" Mr. Bambridge replied, "Yes; they are very good." The prisoner then turned to witness and remarked that they were splendid mantles. Witness said, "Yes; but who are you? You are here to-day and gone to-morrow." Prisoner said, "Oh, no, certainly not; I am an agent for the Gas Company." The mantles, he added, were guaranteed for two years, but would last for three years. Witness said, "That is all very well, but who guarantees them?" Prisoner said, "The Welsbach Company." Prisoner produced an inverted mantle, and said they were 2s. 6d. each. Witness ultimately said he would take two, for which he paid 5s., and was handed the mantles in boxes by Jones. When he got home, he tested one, in accordance with the directions; and it simply fell to pieces. Subsequently he called at the offices of the Gas Company, and later on saw Mr. Bambridge, who produced a broken mantle. He then took out a warrant for prisoner's arrest. Jones called upon him and said that he had not represented himself to be in the employ of the Gas Company, but that gas companies recommended the mantles; and that all he had said about the Welsbach Company was that his mantles were better than theirs. Witness asked prisoner how much he gave for the mantles, and he replied 1¾d. each; but the difference between that and the 2s. 6d. he charged for them was made up by the guarantee which was given by himself and his two brothers—who were then mentioned for the first time. Upon this, witness telephoned for the police. In answer to Mr. Lloyd, who defended, witness admitted that prisoner's name and address were upon the boxes. He had asked the police subsequently if he might be allowed to withdraw the warrant; but his desire to stay proceedings would have been conditional upon prisoner leaving the town and making a donation to some charitable institution. Prisoner, in giving evidence, said he was engaged by his brother as an agent for the sale of incandescent mantles. He had sold thousands of the upright mantles, and had never had any complaint. He did not tell Dr. Grey anything about the Gas Company, or that he represented them. In regard to the Welsbach Company, the only thing he said was that his mantles were better than theirs. He denied that he had ever mentioned the name of the Gas Company in any of his business transactions. Prisoner was committed for trial at the next Assizes; bail being granted in the sum of £50 and one surety of £50.

## Company Fined for Cutting-Off a Water Supply.

At the local Police Court, the Canterbury Gas and Water Company were summoned by Mr. Henry Baker, Licensee of the "Fleur de Lis" Tap, for a breach of the Water-Works Clauses Act of 1847 by wrongfully cutting-off his water supply. The complainant was the tenant of Mr. Sanderson, the proprietor of the "Fleur de Lis" Hotel. By the agreement between them, the landlord was to pay the water-rate; and by arrangement existing between Mr. Sanderson and the Company—the origin of which both parties said they were unable to trace—Mr. Sanderson was supplied at £3 a quarter minimum. The Company claimed to be unaware that the supplies to the "Fleur de Lis" Tap and Messrs. Hollamby and Williams, a clothiers' premises, which originally formed part of the hotel, but are now let off for separate occupation, were supplied through the hotel meter. On discovering this, they made an offer to Mr. Sanderson, which they claim that he had accepted, that the two let-off portions of the original premises were to be rated separately. The acceptance of the new arrangement by Mr. Sanderson was denied; but it was said he had paid £2 15s. 3d. "on account," which included the amount for the Tap, and because he refused to pay an item of 6s. 3d. which was charged for the Tap separately—and thus to pay for the Tap supply twice over—the Company, who were amply secured by the hotel premises, instead of adopting the procedure against the owner which the law provided for them, wrongfully cut off the water of the tenant, who had been without a supply ever since. Mr. Arrowsmith, for the defence, said some question had arisen between Mr. Sanderson and the Company; and they, on looking into the matter, found that the supplies for the three occupations all passed through the hotel meter at the one minimum rate of £3, which clearly was "not good enough." The Directors accordingly passed a resolution authorizing the changes embodied in a letter to Mr. Sanderson—the reduction of the minimum for the hotel to £2 15s. a quarter, but the let-off premises to have distinct supplies. Messrs. Hollamby and Williams signed the usual application form which was sent to them in reference to this; but Mr. Baker did not. The Company had been too lenient, and allowed the thing to drift. He contended that the Company could not be required to supply the Tap otherwise than by meter or by special arrangement. Whatever the arrangement was prior to March 25, it could not affect the question now. The Company's letter stating that the Tap would no longer be supplied as part of the hotel, and that a reduced minimum rate of £2 15s. would be charged for the hotel, was the only arrangement which had been accepted by Mr. Sanderson. It was accepted by his act in paying the £2 15s. instead of the £3 he usually paid. Evidence was given by Mr. James Burch (Secretary and General Manager to the Company) and Mr. C. H. Page, the Engineer. In reply to a question as to what was the preliminary reason for cutting off the supply, Mr. Burch said that in the first place it was a supply in contravention of the Company's regulations, and, secondly, as the water had been used at the Tap, it was only right that it should be paid for. Ultimately the Magistrates decided that the Company had contravened section 4 of the Water Companies Regulation of Powers Act of 1887; and they imposed a fine of £1 and payment of court fees, 17s. 6d. The Bench also allowed £2 2s. Solicitor's fees.

## Inverted Street Lighting in Deptford.

At the meeting of the Deptford Borough Council last Tuesday, the Lighting Committee reported having considered three proposals by the South Metropolitan Gas Company, in regard to the alteration of the remainder (the Council having already ordered the conversion of the No. 3 and No. 4 burners) of the street-lamps to the inverted type. Mr. J. Sutcliffe, the Borough Surveyor, said the first scheme submitted by the Company was for converting the burners of the whole of the lamps throughout the borough: The second was for the conversion of the lamps in the 48 principal streets, with lamps 555 of which had No. 2 burners, 47 had double No. 4 burners, and 4 had triple No. 4 burners; and the third was for the conversion of the lamps at the corners of the principal streets. At present, there were lamps at these corners, 138 with No. 2 burners, 8 with double No. 4 burners, and 4 with triple No. 4 burners. The Company offered to execute the work of conversion at the following prices: No. 2 burners, 3s. per lamp; double No. 4 burners, 9s. per lamp; and triple No. 4 burners, 15s. per lamp. Under No. 1 scheme, the cost of conversion would be £261, and the increased expenditure per annum £880; the cost of conversion under No. 2 scheme would be £107, and the increased expenditure per annum would be £302; while under No. 3 scheme the respective amounts would be £27 and £75. The Committee went on to report that, after full consideration, they had come to the decision that it was most desirable that the whole of the lamps of the borough should be installed with the new type of burner. They desired to emphasize the fact that the inverted burner gives a light of 120 candles, whereas the present No. 2 burners have a light of 40 candles only. They accordingly recommended that the first scheme be adopted by the Council. The Council referred the report back to the Committee, with instructions to bring it up again in a month.

**Death at a Gas-Works.**—At Castletown, Isle of Man, an inquest was held some days ago on the body of Alfred Callow, 48 years of age. It appeared from the evidence that while the deceased was engaged in cleaning out a purifier at the Castletown Gas-Works, he was overcome by the fumes. As rapidly as possible, he was rescued from his position; but all efforts to restore consciousness failed, and his death ensued. The Jury returned a verdict of "Death from asphyxiation;" and they added a rider to the effect that the deceased was working at very dangerous employment, and that greater precautions should be taken to ensure the safety of men engaged in such operations.

**Gas Supply of Little Hulton.**—The Gas Committee of the Little Hulton Urban District Council have interviewed a Sub-Committee of the Salford Corporation Gas Committee; and arrangements have, it is stated, been come to by which the Council will purchase the whole of the Corporation gas undertaking within their district. The Council will proceed to obtain the necessary parliamentary powers; and the Corporation will continue to supply gas till the scheme is completed. Lord Ellesmere has offered to supply the Council with gas from the coke-ovens in Middle Hulton. Proposals have also been made to the Farnworth and Kearsley Gas Company, who supply the other half of the township, to sell that portion of their undertaking to the Council.

# MISCELLANEOUS NEWS.

## SHEFFIELD UNITED GASLIGHT COMPANY.

### Increased Sales of Gas—Company's New Provisional Order.

The One Hundred and Ninth Ordinary General Meeting of the Sheffield United Gaslight Company was held on Monday of last week, in the Cutlers' Hall, Sheffield—Mr. WILSON MAPPIN presiding.

The CHAIRMAN, in moving the adoption of the Directors' report and the balance-sheet, said that since they last met there had been but little improvement in business generally. So far as Sheffield was concerned, trade had remained somewhat stationary. It might, however, be hoped that, with the giving out of orders by the Government for new ironclads, a fair proportion of the work would find its way into Sheffield, which would tend to do away with the unemployment they had had to deal with for several winters past. It always appeared to him that building ships was one of the best forms of relief work, as it found employment for men of all classes, from the highly skilled mechanic to the labourer, at full wages, which wages were spent on food and clothing and other comforts of life—thus making work in many other branches of trade; while temporary relief works provided by the Government or local authorities could only be paid for at a low rate, and were often of very little use to the community when completed, whereas additions to the Navy at all events conduced to our sense of security. So far as the Company were concerned, they had little reason to complain, as the sale of gas, notwithstanding the state of trade, had exceeded the corresponding period of 1908 by 20,651,000 cubic feet, or 1·23 per cent. As this gain was on the somewhat abnormally large increases shown in the June half years of 1907 and 1908, it must be regarded as being quite satisfactory. Coming to the balance-sheet, the first item shown was coal, which had cost £8366 less, purifying was £223 less, wages £882 less, repairs of works £1213 less, and repairs of mains and services £591 less. The principal items which showed increases on the expenditure side were repairing and refixing meters £242, rates £756 more (making the total paid for rates in the half year £9816), stationery and printing £123 more, general establishment charges and incidentals £159 more, and interest on debenture stock £332 more. On the other side, they had an increased income from gas of £1335, from meter and stove rents £209, and from earnings of the Company's railway waggons £372. Against this, there was a decrease of £7305 from coke, of £472 from tar, and of £781 from sulphate of ammonia; the net result being an increased profit of £2080 over the corresponding period of last year—leaving, however, a deficiency in the sum required to pay the dividend of £6675, which would reduce the amount of the balance to carry forward to £74,767. The average price at which gas was sold during the half year was 1s. 2·92d. per 1000 cubic feet. As he had explained on previous occasions, the Directors, when making the last reduction in the price, took into account the surplus carried forward, and expected to have to draw upon this from time to time to make up the sum required for dividend. The illuminating power of the gas supplied during the half year was 17·31 candles, which was the average of 1138 tests made by the Corporation chemists and the Company's officials. The following figures would show that the Company's business continued to progress in all directions. During the half year, there had been sold 577 gas-fires, 863 boiling and grilling stoves, and 7873 incandescent burners, and 338 additional cooking-stoves had been let on hire. Besides this, the Company had been doing a very considerable business in gas-furnaces—about 40 additional ones having been fixed. The following were some of the purposes for which they were used: Brass casting, silver melting, annealing dies, table-blade forging, bayonet forging, file hardening, testing steel, hardening steel, forging cutters, forging mining drills, case-hardening, hardening chisels and twist drills, forging forks, forging files, tempering knives, &c. There was little doubt that when the furnaces became better known there would be hardly a firm in Sheffield who would not find it advantageous to use them for one purpose or another. The Company had furnaces on show at Shude Hill, and invited manufacturers to bring their material there in order to test what could be done with them. There had been fixed during the half year 29 addition gas-engines, varying in size from ½ H.P. to 145 H.P.; the total horse power being 746½. During the past twelve months, 345,875,000 cubic feet of gas had been supplied to engines, which was an increase of 14,252,000 cubic feet over the previous twelve months. For many years past, the Company in the summer and autumn months had been a good deal troubled with naphthalene, although during the last few years, owing to measures that had been taken, the number of complaints had been greatly diminished; and he was pleased to be able to inform them that this year it had almost entirely disappeared—only 22 complaints having been received up to the present time.

The LORD MAYOR, in seconding, said they would gather that the record was one of increased work and increased profit, although the profit had not been quite sufficient to pay maximum dividends without dipping into the balance. If the Chairman had taken them more into his confidence, he would have prophesied that in the next report the profits would be shown to be almost, if not quite, sufficient to pay the maximum dividend.

Mr. JAMES RHODES asked if the decrease in the receipts from residuals was likely to be permanent, or was it an exceptional half year.

The CHAIRMAN replied that the reduction was chiefly in coke, of which they had now a very large stock. The price, as well as that of sulphate of ammonia, was ruled by the market. When trade improved, prices would probably advance.

Mr. RHODES asked if the reduction was due to competition from collieries, who were selling a great amount of residuals.

The CHAIRMAN said they could get quite as much as other companies.

The report and accounts were adopted, and the maximum dividend, at the rate of 10 per cent. per annum, was declared.

Sir Robert Hadfield, Mr. H. K. Stephenson, and Mr. B. George Wood were re-elected Directors.

An Extraordinary Meeting followed, at which it was decided to modify the apparatus for testing the quality of the gas supplied by the Company, and to reduce the standard for the illuminating power; to authorize the holding of ordinary meetings of the shareholders annually, instead of twice a year as hitherto; to permit debenture stock to be offered for sale by tender as well as by auction; and to confer upon the Company all such other powers as may be necessary or expedient to carry into effect the objects of the intended Provisional Order.

The CHAIRMAN, in explaining the objects for which the Order was required, stated that, with regard to the illuminating power, since the year 1900, when the late Sir George Livesey convinced Parliament that gas of high illuminating power was, owing to the introduction of the incandescent burner, no longer necessary, all the gas undertakings (42 in number) who had obtained fresh Acts of Parliament or Provisional Orders had been allowed to reduce their standard to 14 candles, with the exception of two quite small places—viz., Matlock Bath and Bognor—who applied for, and were granted, a 15-candle standard; and 18 further undertakings had applied for a 14-candle standard this year. The burner by which the Company's gas was tested was now out of date. It did not give the best result for the gas consumed. In 1905, Mr. Charles Carpenter, the present Chairman of the South Metropolitan Gas Company, invented a burner which allowed for the correct adjustment of the air supply to the gas-flame. This burner was at once adopted by the London Gas Referees as the standard for the Metropolitan Companies, and had been allowed to all gas undertakings who had applied to Parliament during the last three years. The object the Company had in view was to discontinue enriching their gas by the use of cannel, which year by year became more difficult to procure; many of the pits where it was obtained having become exhausted. Although the Company were seeking for a 14-candle standard, which would place them on the same basis as other undertakings who had obtained recent Acts of Parliament, it was not the intention of the Directors to reduce the quality to that point. There would probably not be more than half to one candle difference in the illuminating power of the gas supplied; but it would enable the Directors to take advantage of new methods of carbonizing which might from time to time develop. All they desired was to avoid the cost of enrichment, which, under present circumstances, was money thrown away; and there would in reality not be a very great difference in the illuminating power. One thing the shareholders and the public might be quite assured of, the Company, in the face of competition with electricity and oil, would not do anything that would be likely to be in any way injurious to their business. Their future object would be the same as it had hitherto been—viz., to give satisfaction to their customers. It was also proposed that there should only be one meeting of shareholders in each year. For the last three years the number of shareholders present at the September meeting had been 10, 14, and 12 respectively; and he thought all would agree that it was unnecessary there should be more than one meeting per annum. The accounts would be audited each half year as hitherto; and the dividends would be sent out as usual. With regard to the sale of debenture stock by tender as well as by auction, he explained that the reason for obtaining this power (which all other gas undertakings had) was that in June, 1908, when £30,000 of debenture stock was offered, only a portion of it was sold; but after the sale a number of applications for it were made to the Company, which, under present conditions, could not be entertained. There were many people with money to invest who did not care to go to auction rooms, but who would be quite ready to take the stock if it was offered to them for sale by tender. The shareholders, of course, would understand that the object the Directors had in view was to obtain the best price possible.

Mr. HANBURY THOMAS moved, and the CHAIRMAN seconded, that application be made for the Provisional Order; and the resolution was carried.

Mr. THOMAS RICHARDSON proposed a vote of thanks to the Chairman, the officers, and staff. He asked if the saving by the reduction of the candle power would be sufficient compensation for the cost of the Order.

Mr. JOHN ELLIS seconded the vote; and it was carried.

The CHAIRMAN, in reply, said the cost of the Order would not be more than £200; they were not asking for an Act of Parliament.

## HARROW AND STANMORE GAS COMPANY.

### Business Doubled in Six Years—Additional Capital Required.

The Half-Yearly Meeting of the Company was held on Monday last week, at the Holborn Restaurant—Mr. A. H. BAYNES in the chair.

Mr. J. L. CHAPMAN (the Secretary and Engineer) having read the notice convening the meeting, the report and accounts were taken as read.

The CHAIRMAN, in moving their adoption, said his first words must be of congratulation on the further progress of the Company during the half year—progress which, the Directors felt, was largely due to the strenuous efforts of the Engineer, and of the competent staff associated with him, in the conduct of the business. It might not, perhaps, be out of place if he referred to some of the results of the working of the Company during the six months. First, as to the gas-rental. Comparing the receipts for the half year with those of the corresponding period of 1908, they exhibited an increase of £1526, although the price of gas had been reduced by 1d. per 1000 cubic feet throughout the whole of the district. The receipts for the hire of meters, stoves, and house fittings presented an increase of £221; and for residuals of £263. The latter amount would have been much larger but for the fact that values had greatly depreciated during the past six months. The quantity of coal carbonized was 1011 tons in excess of the amount used in the corresponding half of 1908, at an increased cost of £859. Some 5055 gallons of oil more had been used than in the first half of 1908; and the increased cost of oil was £140. There were advances in certain other items of expenditure. By an addition to the workmen's insurance fund, this now amounted to £315; and an allowance of £734 had been made for the

depreciation of coin meters, house-services, and stoves. The receipts of the half year totalled to £20,934—an increase over 1908 of £2055. The total expenditure was £14,607, or an increase of £1594. The make of gas in the half year was 95,271,000 cubic feet, of which 70,143,000 was coal gas, and 25,128,000 cubic feet carburetted water gas. The coal used amounted to 6321 tons, from which was produced, on an average, 11,096 cubic feet per ton. The quantity of oil used was 59,265 gallons; and per 1000 cubic feet, 2·35 gallons. The amount of gas sold was 90,800,000 cubic feet, or an increase of 10,501,000 cubic feet, which was rather more than 13 per cent. above the corresponding period of 1908. In this connection, it was interesting to note that the quantity of gas sold was equal to 95·32 per cent. of the quantity made, and there was used on the works 1·22 per cent.; so that the unaccounted-for gas was 3·46 per cent. With regard to the capital account, the proprietors had doubtless noted that during the half year there had been considerable payments. A sum of £699 represented the expenses of the arbitration and legal charges connected with the purchase of new land, which was absolutely called for by the growth of the business. Upon the building of new show-rooms, and providing larger office accommodation, £733 had been spent. A sum of £3050 was the cost of laying new mains and service-pipes to meet the demands arising from new roads and houses in the Company's rapidly growing district. On new meters, £212 had been spent; and on new stoves, £631. In March last 1000 "C" shares were sold by tender, producing a premium of £4500, which sum was added to capital, but received no dividend; and subsequently £4480 of 4 per cent. debenture stock was allotted to applicants. Reverting to the half-year's working, the total profits amounted to £6327—an increase over the first half of 1908 of £461. Debenture stock and interest on loans would require £821; and the dividend recommended would need £4966—leaving a balance of £539. It was proposed to carry to the reserve fund account the balance due from the reduction in the price of gas—viz., £317—and to carry £222 to the previous balance of £4122, which would give a sum of £4344 to be carried forward to the new account. To meet the continually increasing demand for gas, the Directors had entered into a contract with Messrs. John Aird and Sons for the construction of a gasholder tank; the contract to be completed in October next. They had also made a contract with Messrs. Cutler and Sons for the construction of a holder to contain rather more than 1 million cubic feet—this contract to be completed in July next. In pursuance of notice, at the close of this meeting, an extraordinary meeting would be held to authorize the Directors to raise the balance of the capital which they were entitled to sell under the Company's Act of 1903. In conclusion, he said he ventured to think the record for the half year was a very satisfactory one. It reflected great credit upon the Engineer and the staff working under his superintendence; and he (the Chairman) was sure the proprietors would join heartily with the Board in this expression of appreciation for faithful and efficient services.

Mr. A. F. PHILLIPS seconded the motion.

Mr. JOSEPH CASH remarked that there were no criticisms to be made of the report and the accounts. They were excellent, and reflected the greatest credit on all concerned. One of the most singular facts in connection with the working was the remarkable increase shown as compared with other gas companies of which he was aware. There were very few companies that for the past half year showed an increase; and those that did mostly exhibited increases limited to 1, 2, or 3 per cent. That the Harrow Company had obtained such a large increase under the circumstances was proof of the great stability of the Company and of the growth of the district. He congratulated the Engineer on the excellent figures he had shown. His oil consumption of 2 35 gallons per 1000 cubic feet was very creditable; and it was a figure that would be very difficult to beat. Another thing he (Mr. Cash) noticed was that Mr. Chapman's fuel account was a record—14½ per cent. He did not think anybody else had obtained so low a figure yet.

The motion was unanimously agreed to.

Proposed by the CHAIRMAN and seconded by Mr. HORACE J. RYDON, dividends were declared at the rates per annum of 10½ per cent. on the original capital, of £7 7s. per cent. on the additional "C" capital, and of 7 per cent. per annum on the additional "B" capital and guaranteed shares—all less income-tax.

The CHAIRMAN proposed that the Board be empowered to place to the credit of the reserve fund £317 5s., which was the undivided sum they could deal with under the sliding-scale owing to the reduction of the price.

Mr. JAMES RANDALL seconded the motion; and it was unanimously carried.

Mr. A. F. PHILLIPS, in proposing a vote of thanks to the Engineer and Secretary, the staff, and the workmen generally, remarked that it would be readily understood that with a Company growing as theirs was doing, and with such a developing district, extra exertion on the part of the Manager and continual extension of works were always being called for. Mr. Chapman had had great difficulty in acquiring the land recently bought; and now he was involved in difficulties in getting some of the footpaths upon it diverted. When this task was completed, he had to carry out further extensions of the works. These continued extensions involved the Company in large additions to capital. If any proprietors took the trouble to work out the costs in proportion to the increased sale, they might appear somewhat high; but he must remind them that all these extensions were being carried out on a scale to meet future increases. It was hoped, therefore, that, when the extensions were completed, they would not have to be continually making large additions to the capital account.

Mr. A. W. OKE seconded the motion, which was carried.

Mr. CHAPMAN, in his reply, acknowledged the loyal support that he received from his assistants and the whole of the employees. Regarding general matters, he mentioned that the largest increases in business were being experienced in the parts of their district lying nearest to London. Touching this point, he stated that in 1903 the staff gave him a walking-stick (which he much prized) in commemoration of the fact that, in that year, the Company reached a make of 100 million cubic feet. They were practically certain this year—only six years since that event—of making 200 million cubic feet, which meant a doubling of the business in this comparatively short period.

An Extraordinary Meeting was then held, at which, on the motion of the CHAIRMAN, seconded by Mr. A. F. PHILLIPS, a resolution was passed authorizing the Directors to issue a further £33,000 of additional capital and to borrow, by the creation of debenture stock, £11,000 in respect of such additional capital.

Moved by Mr. F. LENNARD, and seconded by Mr. F. R. SMITH, a hearty vote of thanks was passed to the Chairman and Directors.

## PROVINCIAL GAS COMPANIES.

### A Small Decrease in Consumption at Dover.

In the report which was submitted to the half-yearly meeting of the Dover Gas Company on Monday of last week, the Directors stated that they had had to meet a claim by the Inland Revenue Authorities for income-tax on amounts written off their slot-meter installation account for depreciation in former years. Consequently the net profits for the six months to June 30 were not quite sufficient to provide the full statutory dividend. The Board, however, recommended the declaration of a dividend for the half year on the stock and shares at the usual rate of 7½ per cent. per annum. This would necessitate the withdrawal of the sum of £121 only from the accumulated surplus profits of past years. They had again succeeded in securing a reduction in price in their contracts for the supply of coal for the ensuing twelve months; and they hoped this would result in the profits for the whole year being sufficient to cover the dividend for the same period. The Chairman (Mr. Willsher Mannering) said the result of the working must be considered satisfactory. Though they had to meet a charge of £200 for income-tax, the profit was within £121 of the sum required for dividend. This amount would be drawn from accumulated surplus profits of former years, and would leave the substantial balance of £4567 to be carried forward. In the previous half year, the profits exceeded the dividend by upwards of £200; so that the trading for the year ending June last had resulted in the dividends being earned and £100 being added to the surplus profit balance. With reference to the revenue account, as compared with the corresponding period of last year, the receipts from gas were down £471. This was owing to the regrettable decrease of 3 per cent. in the consumption. Unfortunately, they were still suffering from trade depression and the large number of empty houses in the town. There was also a small decrease in meter and stove rentals of £8, and a falling off in the returns from residuals of £234. The make of gas was a little less, and prices had been rather lower. Thus there was a total decreased revenue of £713. This decrease, however, had been more than counterbalanced by reduced expenditure. There was a saving of £1324 on coal. The quantity used was less by 236 tons; but the chief difference was owing to the reduced cost of 2s. 2½d. per ton. Purification, salaries, and wages, were £69 less. On the other hand, repairs and maintenance of works cost £248 more. This was due to the payment of the balance of the cost of the renewal of the roof of the coal-store. Distribution charges on the whole were £213 less. Rates and taxes were £47 more; and other items made a total decreased expenditure of £1278. The balance carried forward to the profit and loss was £4272, as compared with £3707, or an increase of £565. After payment of income-tax, interest on loans, and placing £250 to the suspense account, there was an increased net profit of £366. With cheaper coal and nothing unforeseen, the Board anticipated that the profits would be sufficient for the dividends for the ensuing twelve months. The success of the concern in a great measure depended on the efforts of the staff; and it was gratifying to bear testimony to the efficient way in which the work had been carried on in all departments by the united action of the officers and the workmen, who were desirous of doing all they could to promote the prosperity of the undertaking. The report was adopted, the dividend recommended was declared, and the Chairman and Directors, Resident Engineer (Mr. R. Herring), Joint Secretaries (Messrs. G. and E. C. Fielding), and the staff generally were thanked for their services.

### Hastings Gas Company and the Corporation.

Dr. G. G. Gray, J.P., the Chairman, in moving the adoption of the report and accounts at the half-yearly meeting of the Hastings and St. Leonards Gas Company last Thursday, pointed out that the principal feature of the past six months' working, as shown by the balance-sheet, was that though there was a reduction in the price of gas of 2d. per 1000 cubic feet as from the commencement of the year, which carried with it the right to increase the dividend, and though this additional dividend had to be met, yet the profit had been such as was sufficient to pay all the interest and dividend as in the past, and also the additional dividend. The profit for the half year amounted to £12,812, or in round figures an increase of £1000. Naturally, those who had considered the matter would have conceived that this had not been accomplished by an increase in the receipts, seeing that they had to sell their commodity at a reduced price, though, as a fact, they had sold more gas than in the corresponding half year. The increase in the amount of gas sold amounted to 1½ million cubic feet; and really, he should say, it was equal to 3 million cubic feet, because in the last half year they had one day less—it being leap year—as compared with the corresponding half of last year. In comparison with the affairs of similar companies, the report could not be considered unsatisfactory. Their good position was due to the reduction in the expenditure, and to economy in the working. The principal item was that of coals, &c., which showed a saving of £2015. This was anticipated. But it was not in anticipation of it that the Directors thought they saw their way to reduce the price of gas; and it was satisfactory to them to see that the opinion they then formed had been confirmed by the half-year's working. The saving of coal was to some considerable extent discounted by the condition of the coke market. While on the question of coal, he would draw their attention to the position they were in as regarded carbonization. Their carbonizing results were the best on record. The report on carbonizing during the month of August, too, was one of the best they had had. The report showed that they had made over 11,800 cubic feet per ton of coal; and though this was the best they ever had, he might say that for some time past they had sold

800 cubic feet per ton more than they used to, so that they got from their coal an increased amount of gas, while they were also carbonizing at less expense. The next item on which a considerable saving had been effected was repairs; the net saving being no less a sum than £1694. The chief item of expenditure which showed an increase was rates and taxes; the increased amount being £211. Taking this and sundry other items into consideration, there was a net decrease of £287, so that the total net decrease in expenditure for the half year amounted to £3785. From the sale of gas there was a net decrease in the amount received of £1315. Residuals showed a decrease of £1538, due to the low price of coke, and to some extent to the fact that rather less coke was sold. Sundry items showed a net increase of £21; so that the total decrease in the receipts amounted to £2832, which, when deducted from the total decrease in expenditure of £3785, left an increased profit of £953. The rates had been increasing. This was a thing they did not like; but it was no use grumbling at it. For some time, however, they as a Company had complained at what they considered anything but fair, straightforward terms, because they had to compete with the Corporation in the sale of another commodity and illuminant. While competition was fair, they did not grumble; but when that commodity was sold, as it had been sold, at less than cost price, so that there had been a deficiency, and this deficiency had been thrown upon the rates, the Company, as one of the largest ratepayers of the town, had been called upon to pay for this other illuminant, which they had not used themselves. Then they said it was not fair trading. They knew it was done by virtue of a Provisional Order obtained long ago; and if the Corporation had to go to Parliament, they would find that this would soon be altered. They had complained, but it was not much use complaining; and the time came when the Corporation were not satisfied, and did what they (the Company) considered was grossly unfair. They overstepped the line, and did what was even illegal. The Company thought the time had come when they were bound to protest, and not only protest, but take action; and they got the illegal amount struck out of the rate. It was true that other items were substituted (which, rightly or wrongly, had been omitted from the rate) for this amount which had been struck out; but these amounts having been charged to the rates, the future rates would benefit by not having to be charged with them. But what would eventually become of the amount struck out? For, of course, it should fall upon the undertaking to which the deficiency was due. As to whether it would, or whether a manipulation of the accounts would enable it to be paid indirectly by the ratepayers, they did not know. Possibly they might never know. This was not fair competition; but unfortunately they had to deal with it, and they had successfully taken proceedings. Probably all those present had seen the illuminations that had been carried out on the Palace Pier by the Gas Company. So general had been the testimony to the good effect, that he would say nothing on the point; but he would like to remark that the Gas Company carried out the work at half the price required by the Corporation to do it. This would show what could be done by gas by way of illuminant, and also what could be accomplished from an economic standpoint. The report was adopted; and the full statutory sliding-scale dividends were declared, at the rates of 6½ per cent. per annum on the 5 per cent. converted stock, 5 per cent. on the 3½ per cent. converted stock, and £6 1s. on the 5 per cent. additional stock. A vote of thanks to the Chairman, the Directors, the Engineer and General Manager (Mr. Charles E. Botley), and the staff concluded the meeting.

### A Satisfactory Half Year at Lewes.

The report which was adopted at the half-yearly meeting of the Lewes Gas Company last Wednesday stated that the revenue account showed a profit for the six months to June 30 of £2109. After providing for interest on mortgages, the balance of net revenue as shown in the profit and loss account was £4045. The Directors recommended dividends for the half year at the rate of 5 per cent. upon the original capital stock and 3½ per cent. on the additional capital stock. These dividends, after the deduction of income-tax, would amount to £1403. The Chairman (Mr. M. S. Blaker) congratulated the shareholders upon a successful half year. He said the receipts from gas were satisfactory. The amount was not quite so large as in the corresponding half of the previous year; but in making a comparison between the two periods, it must be remembered that last year the price was 3s. 10d. per 1000 cubic feet, while for one quarter of the past half year it was 3s. 8d. Considering the reduction of 2d. for one quarter, the small diminution of less than £20 in the total receipts was a matter for congratulation. There was an increased output of gas of 368,000 cubic feet last half year, as compared with the corresponding half of 1908. There had been an increase of 37 in the number of consumers, including both ordinary and prepayment meters. The increase of the latter was remarkable. Perhaps the most satisfactory part of the accounts was to be found on the payments' side, especially in the manufacture of gas. Of course, the sum paid for coal was not so much as last year, the price having been less; but the other items—payment for purifying materials, wages and gratuities, and general repairs—all showed a decrease, and the Manager (Mr. Edward Jones) was to be congratulated upon having effected a reduction in the payments under these heads. The receipts for residuals had not been equal to those during the corresponding half; and he was afraid he could not hold out any hope that in the current six months their value would be larger. The usual dividends were recommended; and they would be paid out of the earnings of the Company during the half year, and not, as had sometimes been the case, by drawing to an extent upon the reserve. They were very fortunate in their officers. The Secretary (Mr. H. J. Hillman) was connected with the Company by an hereditary tie, his father having been Secretary before him; while in Mr. Jones they had a Manager in whom they felt the greatest confidence.

### Waterford and Profit Sharing.

Presiding at the annual meeting of the Waterford Gas Company, Mr. George Lynch remarked that the report of the year's working was a favourable one. The works were maintained in good condition; but they had before them this year the re-building of the engine-house, and the renewing of engines and exhausters. For the advantage of the workmen, the Directors had assisted them to establish a social club, where they could read or otherwise amuse themselves after work. The club was largely used. The men had asked for, and the Board had consented to introduce, a profit-sharing system; and they expected it to be in operation before the end of the year. The tide, he was glad to say, had turned in favour of gas, as compared with electricity or any other illuminant. A dividend at the rate of 6½ per cent. was declared.

## OTTOMAN GAS COMPANY, LIMITED.

### Turkish Affairs—The Question of Heavy Charges.

The Ordinary General Meeting of this Company was held on Tuesday last, at the London Offices, No. 9, Queen Street Place, E.C.—Colonel JAMES LE GEYT DANIELL in the chair.

The SECRETARY (Mr. Thomas Guyatt) read the notice convening the meeting; and the report (which was noticed in last week's "JOURNAL," p. 651) and the statement of accounts were taken as read.

The CHAIRMAN, in moving the adoption of the report and accounts, remarked that he had no doubt the shareholders would expect some expression of opinion from him with regard to the effect of the revolution that had lately taken place in Turkey upon the affairs of the Company. Speaking of Smyrna, they had enjoyed the great advantage of a Manager there who was able to keep his head cool and himself calm during periods of considerable excitement—sometimes not unattended by fear of damage. He did not think that what had happened had had much effect upon the affairs of the Company in Smyrna; but, of course, when old people were turned out and new people were put in, it always took a little time to settle down to the change. He might mention that the Directors had availed themselves of the presence of Sir Edwin Pears in England to take him into their counsels. He was a gentleman of great ability and experience, and had lived in Turkey for thirty or forty years or more. There was no man who knew Turkish affairs better than he did, and being in Constantinople he could see things as they occurred. He (the Chairman) was quite sure Sir Edwin would not leave a stone unturned in looking after the interests of the Company. Sir Edwin had impressed the Directors very much with the opinion which he (the Chairman) had held ever since his visit to Turkey—that Smyrna had an enormous future before it. From its position and everything else, it was one of the most important places, and would be one of the most important ports in Turkey, Sir Edwin seemed to think; and it was to be hoped that he was correct in this idea. When looking at the accounts, the shareholders must remember that they were made up to June 30, and imagine that they were meeting on July 1. Things had, of course, altered since June 30. The debentures, for instance, were paid off the very next day. As to the various items in the accounts, in sundry creditors there was a small increase as compared with the corresponding period of last year; but it was all easily accounted for. The Imperial Ottoman Government figured for £1032; and he supposed the only change in Smyrna was that money was rather more difficult to get perhaps than was the case previously. This, however, would right itself in time. On the other side of the balance-sheet, fixed plant stood at the same amount as on Dec. 31. Of the addition of £2930 under sundry debtors (as compared with the first half of 1908) gas consumers alone accounted for £1724, and public lighting for about £700. Stocks showed a decrease of £1435. Investments were sold to meet the debentures which, as he had already mentioned, were paid off. Turning to the revenue account coals cost £6273; but they used 400 tons odd more. The average price worked out at 18s. 7½d. per ton, against 19s. 2d. in the corresponding six months. A question was asked him a year ago about the local coal; and he would anticipate it on the present occasion. It might be satisfactory for the shareholders to learn that the contract for Durham coal for the year to June 30, 1910, was 2s. 2½d. per ton less than this year. The contract for Turkish coal for the same period was also entirely satisfactory. In addition to this, the Directors had an opportunity of which they availed themselves, of making a further contract to June 30, 1911, at 1s. 3d. per ton less than the 1910 contract. The quantity of gas made was 6,483,000 cubic feet more than in the same period of 1908; and the make per ton was 10,685 cubic feet. Salaries and lamp lighting together were more; but the shareholders would have been prepared for this at the last meeting, when mention was made of a very ugly looking strike which had broken out in Smyrna. So far as their Company were concerned, he was glad to say that the strike was averted; the matter being most admirably handled by their Manager out there, who showed immense tact and firmness. The Company's men stuck to their employment, and performed their work cheerfully, as they were still doing. Taking the credit side, while the item of products and sundries remained the same as in the corresponding half year, the gas-rental had increased by £1850, the whole of which had been contributed by private lighting. The balance of profit was £4203. Having given this brief account of the Directors' stewardship to the end of June, he ventured to congratulate the proprietors on the strong and sound position of the Company. They had now redeemed the whole of their debentures. Whatever in years gone by might have been the relative proportion that their output of gas bore to the expenditure, they had gradually, during recent years, brought the make of gas in relation to the capital expenditure to a position which—without giving any figures—he might say many companies even in England would be glad to be able to boast of. The Company had done their best to give satisfaction to all customers, whether private or public. The Directors were determined that Smyrna should be provided with the best possible light they could give it.

Mr. STEPHENSON R. CLARKE seconded the motion; and it was at once carried.

On the proposition of the CHAIRMAN, seconded by Mr. H. WARD ANDREWS, dividends for the half year were declared at the rate of 7 per cent. per annum on the preference shares, less income-tax, and at the rate of 8 per cent. per annum on the ordinary shares, tax free.

The CHAIRMAN proposed a vote of thanks to Mr. John Gandon, the Engineer (whom he was pleased to see present at the meeting), and the staff in Smyrna, and also to the Secretary. He said he had already

mentioned how much the Company were indebted to Mr. Gandon; and they all knew what they owed to Mr. Guyatt.

Mr. A. M. PADDON, in seconding, remarked that everything indicated that Turkey must develop very much in the future; but if this development was to be attended by constant changes and disturbances, it must be plain to the proprietors that they cwed much to the officers who were able to maintain the position and prosperity of the Company.

Mr. J. TYSOE, in supporting the vote, said he was pleased to hear that the finances and general condition of the Company were so very first rate; and he firmly believed that they were on the right road for continued success. There was one suggestion he would like to make to the Engineer. Mr. Gandon no doubt knew well that matters with regard to carbonization were moving in a certain direction, and that results had been attained which would have a very great effect on gas undertakings generally. He spoke of the introduction of twelve-hour charges—a question with which Mr. Gandon was probably fully acquainted. He (Mr. Tysoe) had himself had considerable experience of the matter. In the large works he controlled, they worked this system; and it had proved very satisfactory. The results were certainly much different from what he thought they would be. He, in common with many others, had believed that the acme of efficient carbonization was small charges burned off quickly. Now, to his surprise—and he believed to the surprise of others—it had been proved conclusively that the proper system was to fill up their retorts with large charges and work them off in twelve hours, instead of six hours as heretofore. By this means, they obtained better coke, and anything from 1000 to 1500 cubic feet more gas per ton of coal. It might be possible to do this in Smyrna; and he suggested that experiments should be made.

The vote having been heartily carried,

Mr. GANDON, in acknowledgment, said the vote was most encouraging to him and to the staff. At the time of the strike in other works in Smyrna, the Company had no difficulty with their men; but they naturally had to raise their wages. With regard to heavy coal charges, they had been working with them for years. At Smyrna, they had 9 feet retorts, and were putting into them 4¾ cwt. for six-hour charges. This, he thought, was quite as good as anyone else did. They obtained from 9000 to 9500 cubic feet of gas per mouthpiece per day. This was with ordinary cheap ground-floor settings. He did not think anything better was being done with regenerative settings.

Mr. TYSOE: It is very good.

Mr. GANDON (continuing) said he thought Asia Minor had a very fine future; and they in Smyrna would do everything they could to have a share in this future.

Mr. GUYATT also briefly returned thanks.

Mr. A. W. OKE, in proposing a vote of thanks to the Chairman and Directors, said the balance-sheet spoke for itself; and the shareholders felt that, with such an excellent Board, ably supported by the officers of the Company, the undertaking would enjoy prosperity in the future, as in the past.

The vote was heartily accorded; and the CHAIRMAN acknowledged it.

## COLONIAL GAS UNDERTAKINGS.

Reports of the working of the following Colonial gas undertakings for the half year to June 30 have recently come to hand (in addition to those of the Australian Gaslight Company and the Melbourne Metropolitan Gas Company, already noticed in our pages).

The revenue of the Brisbane Gas Company from the sale of gas, &c., during the six months was £27,364; and there was a balance brought forward of £5513, making a total of £32,877. The expenditure on gas manufacture, &c., was £13,564; and £3079 was placed to the reserve fund. The net amount to the credit of the profit and loss account was thus £16,234, out of which the Directors recommended a dividend of 6 per cent., which, with income-tax, would absorb £10,080, and leave a sum of £6154 to be carried forward. During the half year, extensions of mains were made in several localities.

The Maryborough (Queensland) Gas and Coke Company, Limited, brought into the accounts for the past six months a balance of £251. Sales of gas, fittings, &c., during the half year produced £2575, residual products £210, and interest £12. Thus there was a total of £3049, from which had to be deducted the expenditure of £2008, which left a disposable balance of £1041 at the credit of the profit and loss account. The Directors recommended the payment of a dividend for the half year at the rate of 6 per cent. per annum, tax free, which would absorb £773, and leave £268 to be carried forward.

After allowing for reserve and depreciation, the North Shore (Sydney) Gas Company, Limited, realized a net profit on the sale of gas, &c., of £6132, which, added to a balance of £72 brought forward, left an amount of £6204 available. Out of this sum, the Directors recommended a dividend of 4 per cent. for the half year, free of income-tax. This would absorb £6148, and leave £56 to be carried forward.

**Inconveniences of Electricity.**—A local paper furnishes the information that the electric light at Llandudno "again" failed last Saturday week—shops, theatres, and streets being plunged into darkness just at the very busiest time of the evening. The light went out at the Grand Theatre during the performance of the "Merry Widow;" but fortunately there were gas-lights at hand which it was possible to turn on. There was a second failure less than half-an-hour later.

**Chesham Water Supply.**—A scheme for extensive improvements at the Chesham Urban District Council Water-Works has been completed. Part of the plant laid down when the works were constructed in 1882 having been the source of considerable trouble, the Council sought expert advice; and a scheme for a new pumping-station, at a cost of £6000, was submitted. This, however, with a later and less expensive proposal, was subsequently rejected on the score of economy. Then a third scheme, prepared by Mr. P. C. Dormer, Engineer to the Council, was accepted; and the work has been carried out under his supervision. The outlay was £1087; and to this have been added certain extras, which will bring the total cost up to £1150.

## GAS SUPPLY AT MASTERTON, N.Z.

The report is to hand of the Manager of the Masterton (New Zealand) Borough Council Gas-Works—Mr. James W. Blackman—for the year to March 31 last. In the course of it, allusion is made to the removal of the works to a new site, involving an estimated outlay of about £5000.

The output of gas for the period under review was 25,311,800 cubic feet, as against 21,951,100 cubic feet for the previous year—showing an average rate of increase of 15·3 per cent. The unaccounted-for gas was 1,636,300 cubic feet, equal to 6·64 per cent. The total cash revenue was £8607, and showed an increase of £444 from gas supplied and a decrease of £188 from residuals. The increase in the revenue from gas was considered satisfactory, in view of the fact that the reduction in the price of gas made at the latter end of 1907 represented a loss of £626. The decrease in receipts from residuals and coal was partly on account of the extremely mild winter so far experienced, and partly owing to the fact that practically the whole of the output of tar was sold to the Works Department of the Council at 4d. per gallon.

The gross profit on the manufacturing account amounted to £2066. Interest and sinking fund absorbed £1193; the amount expended on capital account from revenue was £789 13s. 6d.; and after other sums had been met, there was a credit balance in the bank of £786.

In November, 1907, the price of gas was reduced to 10s. per 1000 cubic feet, with a discount of 2s. 11d. per 1000 for lighting, 4s. 2d. per 1000 for cookers, and 4s. 7d. per 1000 for power purposes. There is an intermediate discount of 3s. 4d. per 1000 allowed where boiling-rings, grillers, or gas-fires are used. In view of the fact that during the coming financial year the gas undertaking will have to find the interest and sinking fund charges for the amount of £1440 owing to the loan expenditure on the new works account, Mr. Blackman does not recommend any further reduction in price until such time as the new plant is in working order, and the saving in the manufacturing cost thereby effected is available for the payment of the additional interest charges.

## AN ACCIDENT AT KILMARNOCK GAS-WORKS.

### Board of Trade Report.

Last May an explosion occurred in connection with a cast-iron stop-valve chest at the Kilmarnock Gas-Works, by which the works foreman was somewhat severely scalded. An inquiry into the circumstances attending the accident was duly held, on behalf of the Board of Trade, by Mr. James Cormack, whose report has now been issued. He states that the explosion took place while the stop-valve was being opened in order to connect up one of the boilers, which had been laid off for a few days; and it appears to have been caused by a "water-hammer" shock, which the chest was unable to withstand.

The body and cover of the stop valve chest were of cast iron; while the spindle, valve, and seat were of brass. The bore of the valve-seat and the branches of the chest was 3 inches. The thickness of the body of the cast-iron chest was fairly regular, and measured ⅜-inch at the thinnest part disclosed by the fracture. The chest was fitted about eight or nine years ago. The valve was ground-up and made steam-tight by one of the fitters employed at the gas-works about twelve months prior to the explosion. The boiler plant consists of two Cornish boilers, which are used to supply steam to the engines which drive the scrubbers and the exhausters of the gas plant; and they are also available to supply steam for heating purposes and for driving the pumps of the ammonia recovery plant. The steam-pipes are arranged so that the boilers may be used either together or singly for each of the purposes mentioned; and the stop-valve, the chest of which was fractured by the explosion, was part of the arrangement whereby one of the boilers "A" could be shut off. The maximum working pressure of this, the older of the two boilers, is 50 lbs. per square inch; and it is mainly used to supply steam to the engines in connection with the gas plant—the engine-house being situated about 80 feet from the boiler-house. The safety-valve of the newer boiler "B," which was installed about nine years ago, is adjusted to blow at a pressure of 80 lbs. per square inch; this higher pressure being found necessary to provide against the condensation in the range of pipes between the boiler-house and the ammonia plant—there being a total length of about 160 feet of pipe in this range. Throughout the whole of the steam-pipe system there are no drain-cocks fitted, except those on the cylinders of the engines and pumps. The major portions of both ranges of steam-pipes have a slight droop towards the boilers.

The evidence was to the effect that for a few days prior to the date of the accident, boiler "A" had been shut down for repairs, and boiler "B" had been used to supply steam to the gas plant machinery. The ammonia plant, not being in operation every day, had meanwhile been standing idle. The stop-valve upon the crown of boiler "A," and the stop-valve, the chest of which was fractured by the explosion, were both shut. The fire was kindled in boiler "A" on the day of the accident, and steam was raised to a pressure of about 30 lbs. per square inch, when the foreman and the stoker on duty proceeded to connect the boiler up by opening the stop-valves; the pressure in boiler "B" at that time being about 40 lbs. per square inch. The stop-valve on the crown of boiler "A" was slowly opened by the stoker; and the foreman was in the act of slowly opening the valve which exploded. He had merely moved the wheel slightly, when, after a slight "click," the upper part of the chest blew off.

There is, says Mr. Cormack, a considerable length of pipe, between the stop-valve which was fractured and the common range of pipes, which would, from its conformation, rapidly fill up and remain full of the water of condensation, if the valve in question were closed, and steam passed into the range of pipes leading to the machinery of the gas plant from boiler "B." These appear to have been the circumstances at the time of the explosion; the easing of the stop-valve which fractured and the higher pressure in boiler "B" being sufficient to put the body of water which had collected in the connecting pipe

violently in motion—thus creating the phenomenon commonly known as "water-hammer," which has been the cause of many explosions from steam-pipes and their connecting stop-valves. A drain-cock has now been fitted to this length of pipe, with a view to preventing a similar occurrence in the future.

The Engineer Surveyor-in-Chief (Mr. A. Boyle) makes the following observations upon the inquiry: "The explosion, as clearly pointed out in the report, was the result of a shock of water-hammer. There appears to have been no provision made for the draining of the steam-pipes; and the conditions at the time of the explosion were extremely favourable to water-hammer occurring. If dangerous water-hammer shocks are to be prevented, it is essential that drains should be provided at the parts of the range where water can lodge; but even when these are provided, the greatest care is necessary in the connecting-up of a boiler that has been out of use to a range of pipes which are in open communication with another boiler under working conditions."

## TREATMENT OF ROADS WITH TAR.

### Experience in Buckinghamshire.

When dealing with the question of tar macadam, in the course of his annual report, Mr. R. J. Thomas, the County Surveyor of Buckinghamshire, makes the following remarks.

Much has been said as to the desirability of laying tarred macadam in various forms upon all main roads; but it is as well to discuss the probable initial cost. In this county, about one-sixth of the metalled area of main roads is coated annually; and 75 per cent. of the entire expenditure over the whole area is incurred in this work. Upon these proportions (metalling one-sixth the area annually, at 75 per cent. of the entire expenditure over the whole area of main roads), the expenditure throughout England and Wales in 1906-7 on the purchase and consolidation of metalling was £1,901,550, out of the total of £2,535,399. Tar macadam cannot be estimated at less than 2s. per square yard, one stone thick, laid complete; and taking one-sixth the metalled area of main roads in England and Wales at about 50,679,200 square yards, its coating in tarred macadam means an outlay of £5,067,920—*i.e.*, £3,166,370 annually in excess of the present expenditure in metalling—representing an additional rate throughout the country of 7½d. The additional annual cost on Buckinghamshire main roads would be £43,700, or equal to a 10d. rate. These figures show that, however desirable, necessary, and ultimately economical it will be to use tar macadam, it is utterly impracticable to make its use general, unless an additional annual sum exceeding £3,000,000 is provided for two or three years to enable road authorities to substitute this material to such an extent as will show a substantial saving in wear, and so reduce the extra cost of laying tar macadam on the remaining portions of roads. It is obvious, therefore, that to make the large majority of country main roads sufficiently strong to withstand the disintegrating effects of modern traffic, more economical and less heroic methods will have to be adopted; the employment of tarred macadam being restricted to the trunk roads most used by all classes of traffic.

Where traffic is heavy and continuous, it is found that tarred macadam loses its bituminous surface or veneer rapidly after the second year, with the result that attrition of the metalling takes place, and dust is created almost as rapidly as on untarred roads. Provision must, therefore, be made for surface tarring such roads in alternate years, if the dust question is of supreme importance. The work practicable with present funds would be that of strengthening weak foundations, the substitution of the hardest materials for local flints and gravel, and their consolidation to a surface impervious to moisture and capable of withstanding all traffic. In Buckinghamshire and adjoining counties, this importation of best materials obtainable is a matter of very considerable cost; the difference between the price of local stone and Shropshire or Leicestershire basalts and granite being very marked, owing to the heavy carriage rates for the latter.

During the year, some 46 miles of rural main roads much used by motors were tar-painted. After many experiments during the past seven years, including tarring 18 inches wide along motor-wheel tracks—which for some inexplicable reason motors frequently avoided subsequently—it was found that the minimum width necessary for keeping granite surfaces down was 9 to 10 feet along the centre; and though it is obvious that to tar the entire area would be preferable, this width was followed at a cost of £15 to £16 per mile, in order to spread the funds available over as great a length as possible. The work was done with a number of 50 to 80 gallon portable boilers, having a perforated pipe-distributor at the back; repeated hand-brushing with bass brooms being resorted to in order to secure penetration of hot tar by absorption into the fabric of the road, and the avoidance of all puddles and inequalities on the surface. This method has proved entirely effective; and in no instance has the granite so treated failed to withstand a summer's traffic. That much of the tar remains in the twelve months' wear, is evidenced by the smaller quantity required for re-painting and by the longer period necessary for completely drying the surface. That a granite road, when tar painted, has at least 20 per cent. longer life where much used by fast motors, is unquestionable.

The cost per square yard—two-thirds of a penny—compares very favourably with that of machine work, which, though under pressure, cannot in one operation secure due penetration, even where jets discharge directly over the openings between stones, neither is the distribution so even as that secured by repeatedly brushing over by hand. Where sharp turns and bends occur on roads much used by motors, it has been expedient to tar the entire width, in order to counteract the disturbing effects of centrifugal skid.

Taking the Bucks price of two-thirds of a penny per square yard, it would cost £704,500 to tar the entire area of rural main roads in England and Wales, or £391,500 to do 10 feet along the centre. Urban main roads would cost £140,000 to tar entirely, and £77,800 for a 10-foot width. This gives a total for all main roads of £844,500 for the whole area, and £469,300 for 10 feet along the centre; and on an assessable value of nearly 9¾ millions, represents a 2d. and 1d. rate respectively. In the first method, there would probably be a saving of 50 per cent. in cleansing, mud removal, &c., representing £104,000, and 25 per cent. (£52,000) in the latter; bringing the net increase in annual cost to about £740,500 and £417,300—rates of 1⅞d. and 1d. respectively.

As already indicated, it is found necessary to tar paint tarred macadam roads after the second year, in order to prevent disturbance of material; so in any comparisons made between surface painting of macadam consolidated in the usual way and tarred macadam, it must be borne in mind that each requires tar painting—the former annually, the latter in alternate years.

A considerable quantity of tar has been used during the past summer in effecting repairs; the method generally adopted being to excavate the metalling to a depth of 2 inches over the entire area of a hole or depression, tar-paint its surface, and well pack and ram into same clean granite, slightly sprinkled with chippings or grit. On roads very much used by motors, granite tarred beforehand has had to be employed; care being necessary to ram until a dense, solid body is attained, capable of withstanding steel-studded tyres.

## A SHOP LIGHTING EXPERIENCE AT HYDE.

There is keen competition between the Stalybridge, Hyde, &c., Tramways and Electricity Board and the Hyde Gas Company, in which competition the former take an unfair attitude in seeking to gain advantages. One of their methods has been to supply electricity at prices that have not produced sufficient revenue to enable the Board to meet their obligations; another has been the advertising in the tramcars of the fallacious statement that electricity is cheaper than gas.

The Hyde Gas Company have in consequence to use the best available means to refute the misleading advertisements. Among their circulars is one which asks: "Which is Cheaper—Gas or Electricity?" and it gives the actual results of the cost of a week's lighting by gas at a shop in Market Street as follows:

*Cost for Gas.*—The shop is fitted up with 20 "Graetzin" incandescent gas-lamps, the lighting power of which the makers claim to be 120-candle power each, equalling a total of 2400-candle power. Number of hours lighted during the week, ten. Gas consumed, as registered on the meter, 1000 cubic feet, which, at 2s. 9d., less 7½ per cent. discount, amounts to about 2s. 6½d., or (say) 3d. per hour for 2400-candle power of light.

*Cost for Electricity.*—It would take 48 "Tantalum" incandescent electric lamps, representing, according to the makers, 50-candle power each, to give an equivalent amount of light—viz., 2400-candle power; and as the Tantalum lamps would consume 85 watts per hour each, the quantity of electricity used would be 40·8 units, which, at 3½d. per unit, would cost 11s. 11d., as against 2s. 6½d., being an extra cost of 9s. 4½d., or over four times the cost of lighting by gas.

There are many similar instances in the town; and to these practical experiences the electricians can make no answer.

## POSITION OF THE LARGE GAS-ENGINE.

### [From the "Manchester Guardian."]

Looked at from almost any point of view, it must be admitted that the position of the large gas-engine in Great Britain to-day is unsatisfactory. With the small gas-engine we do not propose to deal, except in so far as it throws useful light on the position of the large one. It would, perhaps, be difficult to give a comprehensive and acceptable definition as to what constitutes a large gas-engine; but we fancy most engineers are sufficiently agreed to render definition unnecessary. Large-cylinder cotton-mill engines, blast-furnace blowing-engines, and engines for large rolling-mills and electric generating stations would generally be accepted as within any reasonable definition. There are about five British firms engaged or prepared to engage in the manufacture of the large gas-engine; but in each case the engine is of Continental design. It is true that Messrs. Crossley Bros. have made a few engines with moderately large cylinders, and a fair number of multiple-cylinder engines of medium power; but such engines scarcely come within the term "large gas-engines" as ordinarily understood. Several other firms have, indeed, developed the multiple-cylinder engine; and the British Westinghouse Company have made at least one of 1000 H.P. and several not much smaller; but the greatest power developed in one cylinder is only about 125 B.H.P. Hence, though the Westinghouse Company have achieved considerable success with these engines, it cannot be said that they have really done much towards solving the problem of the big gas-engine. It is, for instance, a very long distance in engineering between an eight-cylinder engine of 1000 H.P. and any practical engine of 5000 H.P. or 10,000 H.P.

The development of the large gas-engine in Germany and Belgium has been continuous and fairly rapid. In the United States, the advance made in the last four or five years has been remarkable, and worthy of American traditions. Five years ago, gas-engines of any but the smallest size were almost unknown in the States. To-day it is estimated that the large gas-engines made or building total from 400,000 H.P. to 500,000 H.P.; and some three years ago the Snow Steam-Pump Company, of Buffalo, built some gas-engines for San Francisco of no less than 4000 H.P. It is sometimes advanced in explanation of the more rapid development in Germany that the engines there run mainly on blast-furnace gas, and also on coke-oven gas. The difference in the blast-furnace output of Great Britain and Germany is, however, only about 20 per cent. in Germany's favour; and it is not unreasonable to assume that the power which might be obtained from blast-furnace and coke-oven gases is proportional to the pig iron smelted. Hence it cannot be admitted that the extensive utilization of blast-furnace gas in Germany is any explanation of the slow progress

made by the large gas-engine here. It is quite true that the makers will have to face the problem of running their engines on producer gas, as some of them do now. Indeed, the fact that there is a great future for the large engine using producer gas is one very strong reason why British firms should not be so ready to copy German designs and so disinclined to do any of the necessary pioneer work themselves.

Of the five British firms building the large-cylinder gas-engine, Messrs. Richardson, Westgarth, and Co., Limited, make the Cockerill engine, Messrs. Beardmore the Oechelhaeuser, Messrs. Galloway the Ehrhardt and Sehmer, the Lilleshall Company the Nurnberg, and Messrs. Mather and Platt, Limited, the Körting engine. It is true that Messrs, Mather and Platt have so remodelled the Körting engine that, while retaining the distinctive features of the two-cycle engine, it is virtually a new design, and it is probable that no small part of their success with gas-engines is due to this fact. By reason of the alterations made, the engine is, we understand, much lighter and cheaper to build, and is certainly appreciably simpler in construction—a feature which appeals more strongly to English engineers than to Germans. English firms contemplating the manufacture of big gas-engines have usually advertised for an engineer with experience of such engines. That almost invariably means a German or a Belgian engineer with experience mainly, if not solely, with engines working upon blast-furnace gas. Such a man naturally tends to rely upon his Continental experience; whereas it is found in practice that extensive alterations and adaptations to suit English ideas and conditions are necessary. In such circumstances, the engineer's previous experience may easily prove partly a hindrance.

The fact must be faced that a good deal of development work will have to be done by British firms before the large gas-engine is firmly established; and the qualities in the engineer which make most for success in these circumstances are courage, logic, and invention, tempered by a good knowledge of engineering conditions and reasonable caution. Experience is useful, but it requires even more care in its application to a new design than the inventive faculty; for whereas a new idea is sure to be sharply criticized and probably pronounced impossible or dangerous by half the staff and most of the foremen, an old method applied to meet new conditions will as often as not be accepted without question. An engineer who relies upon experience tends to repeat himself; and the whole idea of development work is to climb away from this repetition. A good deal depends upon the principals of the firm; and to them the large gas-engine presents a nice problem in estimating the relative advantages of buying Continental designs which will probably require alteration, and burden the engines with a heavy royalty, or of getting a young man of brains and ability, and setting him to work to learn by every legitimate means all that can be known on the subject, and afterwards building up their own design. The first method has so far produced wonderfully poor results from the commercial as well as from the technical point of view.

As regards the technical part, it is being realized that it is not sufficient to buy drawings. It is quite true that design has a good deal to do with success; but material and workmanship, especially as they relate to cylinder casting, have also a good deal of influence. A defect which is largely technical, though also partly commercial, is that cost is too high. This, indeed, is the primary defect; and it cannot be too strongly emphasized that reduction of cost is the direction in which progress must be made. Such progress will probably depend as much upon the makers of producer and similar plant as upon the engine builders. Some figures recently collected bearing upon this point showed that there is wide divergence among makers as to prices; and that is rather a hopeful sign for the future. On the commercial side, the chief difficulty is lack of courage, especially on the part of engine builders. Firms already established in the gas-engine business seem to be too well pleased with their trade in engines of medium size. Certainly they have shown a decided disinclination to tackle the large cylinder engine; and this has discouraged everybody. The remarkable advance of the steam turbine has been another retarding factor; but the chief has been lack of initiative and boldness.

## NOTES FROM SCOTLAND.

**From Our Own Correspondent.**

*Saturday.*

The Aberdeen Corporation gas accounts, which were referred to in these "Notes" last week, were submitted to the Town Council on Monday by Mr. W. A. Stewart, the Convener of the Gas Committee, who, in moving their adoption, said that the expenditure during the year in producing gas was close on £100,000; while the income from sales was about £123,000—leaving a net revenue or profit of £22,753. The question the Council had to decide was what they were to do. The Committee proposed that £9000 should be set aside for paying interest, annuities, and insurance; and of the balance they recommended that £10,000 should be put aside for the sinking fund, and that £3000 be paid to renewal account. After putting aside all this, they had still a balance on hand of £612, to which fell to be added the previous year's balance, which allowed them to carry to the current year's account a sum of £3400. The Committee felt that they had dealt very liberally with the sinking fund and the renewal account, and they thought that the consumer was entitled to some consideration also. He was glad that the Committee were able to recommend a reduction in the price of gas from 2s. 7d. to 2s. 6d. per 1000 cubic feet, and that the charge to those using gas for motive power be reduced to 2s. 3d.; and also that those who had prepayment meters should get 29 cubic feet instead of 26 for 1d. During the past year the progress made at the gas-works had been great. The number of cubic feet of gas produced was 730 million cubic feet—an increase of 12 millions over the previous year. Their progress had not only been in respect of lighting, but also in regard to the number of stoves used. These had increased by 410; and they had now 3872 stoves out on hire. These stoves led to the use of a large amount of gas, and helped to lower the price to the ordinary lighting consumer. Not only this, but he thought it would solve the domestic servant problem to a great extent. There

## GAS COMPANIES' STOCK AND SHARE LIST.

**Referred to on p. 682.**

| Issue | Share. | When ex-Dividend. | Dividend or Dividend & Bonus. | NAME. | Closing Prices. | Rise or Fall in Wk. | Yield upon Investment. |
|---|---|---|---|---|---|---|---|
| £ | | | p.c. | | | | £ s. d. |
| 590,000 | 10 | Apl. 16 | 10 | Alliance & Dublin 10 p.c. | 17⅞—18¼ | .. | 5 9 7 |
| 298,955 | 10 | ,, | 7 | Do. 7 p.c. | 12¼—13¼ | +¼ | 5 5 8 |
| 310,000 | Stk. | July 14 | 4 | Do. 4 p.c. Deb. | 96—98 | .. | 4 0 0 |
| 200,000 | 5 | May 27 | 6½ | Bombay, Ltd.. . . . | 5⅝—5⅞ | .. | 5 10 8 |
| 40,000 | 5 | ,, | 6½ | Do. New, £4 paid . | 4½—4¾ | .. | 5 9 6 |
| 50,000 | 10 | Aug. 26 | 15 | Bourne- 10 p.c. . . | 28—28½ | .. | 5 5 3 |
| 311,810 | 10 | ,, | 7 | mouth Gas B 7 p.c. . | 16¼—16½ | .. | 4 3 7 |
| 75,000 | 10 | ,, | 6 | and Water Pref. 6 p.c. | 15⅜—15⅝ | .. | 3 16 8 |
| 380,000 | Stk. | Aug. 12 | 12½ | Brentford Consolidated | 251—254 | +1 | 4 18 5 |
| 300,000 | ,, | ,, | 9½ | Do. New . . . | 190—192 | .. | 4 19 0 |
| 50,000 | ,, | ,, | 5 | Do. 5 p.c. Pref. . | 120—122 | .. | 4 2 0 |
| 206,250 | ,, | June 11 | 4 | Do. 4 p.c. Deb. . | 100—102 | .. | 3 18 5 |
| 220,000 | Stk. | Sep. 10 | 11 | Brighton & Hove Orig. | 208—213* | +2 | 5 3 3 |
| 246,320 | ,, | ,, | 8 | Do. A Ord. Stk. . | 150—152* | .. | 5 5 3 |
| 460,000 | 20 | Apl. 16 | 10 | British . . . . . | 43—43½ | .. | 4 11 11 |
| 109,000 | Stk. | Aug. 26 | 6 | Bromley, A 5 p.c. . . | 117—119 | .. | 5 0 10 |
| 165,700 | ,, | ,, | 4½ | Do. B 3½ p.c. . . | 88—90 | .. | 5 0 0 |
| 82,278 | ,, | ,, | 5½ | Do. C 5 p.c. . . | 106—108 | .. | 5 1 10 |
| 55,000 | ,, | June 25 | 3½ | Do. 3½ p.c. Deb. . | 88—90 | .. | 3 17 9 |
| 500,000 | 10 | May 13 | 7 | Buenos Ayres (New) Ltd. | 13¾—14¼ | .. | 4 18 3 |
| 250,000 | Stk. | June 25 | 4 | Do. 4 p.c. Deb. . | 94—96 | .. | 4 3 4 |
| 100,000 | 10 | — | — | Cape Town & Dis., Ltd. | 4¼—5 | .. | — |
| 100,000 | 10 | — | — | Do. 4½ p.c. Pref. . | 5½—6 | .. | — |
| 50,000 | 50 | May 3 | 6 | Do. 6 p.c. 1st Mort. | 48½—49½ | .. | 6 1 3 |
| 100,000 | Stk. | June 25 | 4½ | Do. 4½ p.c. Deb. Stk. | 82—84 | .. | 5 7 2 |
| 157 150 | Stk. | Aug. 12 | 5 | Chester 5 p.c. Ord. . . | 106½—108½ | .. | 4 12 2 |
| 1,493,280 | Stk. | Aug. 26 | 5 5/10 | Commercial 4 p.c. Stk. . | 108—110 | +1 | 4 14 7 |
| 560,000 | ,, | ,, | 5 | Do. 3½ p.c. do. . | 103—105 | .. | 4 15 3 |
| 475,000 | ,, | June 11 | 3 | Do. 3 p.c. Deb. Stk. | 81—83 | .. | 3 12 3 |
| 800,000 | Stk. | ,, | 5 | Continental Union, Ltd. | 95—97 | .. | 5 3 1 |
| 200,000 | ,, | ,, | 7 | Do. 7 p.c. Pref. | 138—140 | .. | 5 0 0 |
| 492,270 | Stk. | — | 5 | Derby Con. Stk. . . . | 121—123 | .. | 4 1 4 |
| 55,000 | ,, | — | 4 | Do. Deb. Stk. . . . | 103—105 | .. | 3 16 2 |
| 148,995 | ,, | Mar. 31 | 5 | East Hull 5 p.c. Ord. . | 100—102 | .. | 4 18 0 |
| 486,090 | 10 | July 14 | 12 | European, Ltd. . . . | 24½—25 | .. | 4 16 0 |
| 354,660 | 10 | ,, | 12 | Do. £7 10s. paid. | 18½—19 | .. | 4 14 9 |
| 15,141,545 | Stk. | Aug. 12 | 4⅞ | Gas 4 p.c. Ord. . . | 104⅜—105½ | +⅜ | 4 8 5 |
| 2,600,000 | ,, | ,, | 3⅜ | light 3⅜ p.c. max. . | 87—89 | .. | 3 18 8 |
| 3,799,735 | ,, | ,, | 4 | and 4 p.c. Con. Pref. | 103—105 | .. | 3 16 2 |
| 4,193,975 | ,, | June 11 | 3 | Coke 3 p.c. Con. Deb. | 86—87 | .. | 3 8 11 |
| 258,740 | Stk. | Sep. 10 | 5 | Hastings & St. L. 3½ p.c. | 91—93* | +½ | 5 7 6 |
| 82,500 | ,, | ,, | 6½ | Do. do. 5 p.c. | 116—118* | +1½ | 5 10 2 |
| 70,000 | 10 | Apl. 29 | 11 | Hongkong & China, Ltd. | 17⅞—18½ | .. | 6 0 7 |
| 131,070 | Stk. | Sep. 10 | 6½ | Ilford A and C . . . | 138 —140* | .. | 4 12 10 |
| 65,783 | ,, | ,, | 5 | Do. B . . . . . | 104—106* | +½ | 4 14 4 |
| 65,500 | ,, | June 25 | 4 | Do. 4 p.c. Deb. . . . | 102 —104 | .. | 3 16 11 |
| 4,940,000 | Stk. | May 13 | 8 | Imperial Continental . | 179—181 | .. | 4 8 5 |
| 1,235,000 | Stk. | Aug. 12 | 3½ | Do. 3½ p.c. Deb. Red. | 95—97 | .. | 3 12 11 |

| Issue. | Share. | When ex-Dividend. | Dividend or Dividend & Bonus. | NAME. | Closing Prices. | Rise or Fall in Wk. | Yield upon Investment. |
|---|---|---|---|---|---|---|---|
| £ | | | p.c. | | | | £ s. d. |
| 195,242 | Stk. | Aug. 26 | 6 | Lea Bridge Ord. 5 p.c. . | 118—120 | .. | 5 0 0 |
| 561,000 | Stk. | ,, | 10 | Liverpool United A. . | 223—225 | .. | 4 8 11 |
| 718,100 | ,, | ,, | 7 | Do. B . . | 165—167 | +½ | 4 3 10 |
| 306,083 | ,, | June 25 | 4 | Do. Deb. Stk. | 104—106 | .. | 3 15 6 |
| 75,000 | 5 | June 11 | 6 | Malta & Mediterranean. | 4⅛—5⅛ | .. | 5 17 1 |
| 560,000 | 100 | Apl. 1 | 5 | Met. of 5 p.c. Deb. | 102—105 | +1⅛ | 4 15 2 |
| 250,000 | 100 | ,, | 4½ | Melbourne 4½ p.c. Deb. | 102 —104 | .. | 4 6 7 |
| 541,920 | 20 | May 27 | 3½ | Monte Video, Ltd. . | 12¾—13¼ | +¼ | 5 5 8 |
| 1,775,892 | Stk. | July 29 | 4½ | Newc'tle & G'tesh'd Con | 106½—107½ | .. | 4 3 9 |
| 518,795 | Stk. | June 25 | 3½ | Do. 3½ p.c. Deb. | 92—93 | .. | 3 12 2 |
| 55,940 | 10 | Aug. 26 | 7 | North Middlesex 7 p.c. | 13—13½ | .. | 5 3 8 |
| 300,000 | Stk. | Apl. 29 | 8 | Oriental, Ltd. . . . | 139—141 | .. | 5 13 6 |
| 60,000 | 5 | Sep. 10 | 8 | Ottoman, Ltd. . . . | 5⅛—6⅛* | .. | 6 1 0 |
| 31,800 | 53 | Aug. 26 | 13 | Portsea Island A. . . | 137—139 | .. | 4 19 0 |
| 60,000 | 50 | ,, | 13 | Do. B. . . | 129—131 | .. | 4 19 3 |
| 100,000 | 50 | ,, | 12 | Do. C. . . | 120—123 | .. | 4 17 7 |
| 114,800 | 50 | ,, | 10 | Do. D and E. | 101—103 | .. | 4 17 1 |
| 398,490 | 5 | May 13 | 7 | Primitiva Ord. . . . | 7—7¼ | +⅛ | 4 16 8 |
| 796,980 | 5 | July 29 | 5 | Do. 5 p.c Pref. . | 5¼—5⅜ | .. | 4 10 11 |
| 488,900 | 100 | June 1 | 4 | Do. 4 p.c. Deb. . | 94—96 | .. | 4 3 4 |
| 1,000,000 | 10 | Apl. 29 | 8 | River Plate Ord. . . | 16¾—17½ | .. | 4 12 9 |
| 312,650 | Stk. | June 25 | 4 | Do. 4 p.c. Deb. . | 96—98 | .. | 4 1 8 |
| 250,000 | 10 | Mar. 31 | 8 | San Paulo, Ltd. . . . | 14½—14¾ | .. | 5 8 6 |
| 62,500 | 10 | ,, | 6 | Do. 6 p.c. Pref. . | 12—12½ | .. | 4 16 0 |
| 125,000 | 50 | July 1 | 5 | Do. 5 p.c. Deb. . | 49½—50½ | .. | 4 19 0 |
| 135,000 | Stk. | Mar. 12 | 10 | Sheffield A . . . . | 231—233 | .. | 4 5 10 |
| 209,984 | ,, | ,, | 10 | Do. B . . . . | 231—233 | .. | 4 5 10 |
| 523,500 | ,, | ,, | 10 | Do. C . . . . | 231—233 | .. | 4 5 10 |
| 70,000 | 10 | June 11 | 10 | South African . . . . | 13½—14 | .. | 7 2 10 |
| 6,429,895 | Stk. | Aug. 12 | 5½ | South Met., 4 p.c. Ord. | 119—121 | .. | 4 8 1 |
| 1,895,445 | ,, | July 14 | 3 | Do. 3 p.c. Deb. | 85—86 | .. | 3 9 9 |
| 209,820 | Stk. | Aug. 26 | 8 | South Shields Con. Stk. | 153—155 | .. | 5 3 3 |
| 605,000 | Stk. | Aug. 12 | 5½ | S'th Suburb'n Ord. 5 p.c. | 118—120 | .. | 4 11 8 |
| 60,000 | ,, | ,, | 5 | Do. 5 p.c. Pref. . | 120—122 | .. | 4 2 0 |
| 117,058 | ,, | July 14 | 5 | Do. 5 p.c. Deb. Stk. | 122—124 | .. | 4 0 8 |
| 502,310 | Stk. | May 13 | 5 | Southampton Ord. . . | 110—112 | .. | 4 9 3 |
| 120,000 | Stk. | Aug. 12 | 6¾ | Tottenham A 5 p.c. . | 132—134 | .. | 5 2 7 |
| 453,940 | ,, | ,, | 5⅝ | and B 3½ p.c. . | 110—112 | .. | 4 15 11 |
| 149,470 | ,, | June 25 | 4 | Edmonton 4 p.c. Deb. | 100—102 | .. | 3 18 5 |
| 182,380 | 10 | June 11 | 8 | Tuscan, Ltd. . . . . | 9—9½ | .. | 8 8 6 |
| 149,900 | 10 | July 1 | 5 | Do. 5 p.c. Deb. Red. | 99 101 | .. | 4 19 0 |
| 236,476 | Stk. | Aug. 14 | 5 | Tynemouth, 5 p.c. max. | 109—111 | .. | 4 10 1 |
| 255,636 | Stk. | Aug. 26 | 6⅝ | Wands- B 3½ p.c. . . | 138—140 | .. | 4 14 8 |
| 79,416 | ,, | June 25 | 3 | worth 3 p.c. Deb. Stk. | 73—75 | .. | 4 0 0 |
| 895,872 | ,, | Aug. 12 | 5⅝ | West Ham 5 p.c. Ord. . | 124—126 | .. | 4 5 4 |
| 210,000 | ,, | ,, | 5 | Do. 5 p. . Pref. . . | 127—129 | .. | 3 17 6 |
| 253,300 | ,, | June 25 | 4 | Do. 4 p.c. Deb Stk.. | 112—114 | .. | 3 10 2 |

Prices marked * are "Ex div."

was no doubt also that gas-stoves were of great assistance to the wives of working men, who were now able to do their work with less trouble than before; and now that they had reduced the price of gas, the Committee expected that they would have a further development in the use of gas-stoves. While the Committee were gratified that there had been such a large increase in the consumption of gas, the gratification would be more complete if they were sure that the ordinary consumer was getting full lighting value for the amount consumed. Now that incandescent mantles had been so reduced in price, they hoped that people would adopt these burners, by which they would get twice as much light, and their gas bill would be reduced by from 20 to 30 per cent. The Committee desired that the public should get full value, and, with this end in view, they had been showing a number of incandescent lamps in their Union Street depôt. He had to ask the Council to acknowledge the services of the officials at the gas-works. They moved there very quietly, but they moved well, and everything at the gas-works was well done. Mr. Milne, the Manager, devoted an amount of time, energy, and activity to the work that, he was sure, no other official in the service of the Council equalled. Mr. Kendall Burnett, in seconding the approval of the accounts, said that Mr. Stewart's statement was an excellent one, and reflected credit on the Convener, who was deserving of the best thanks of the Council. The accounts were adopted. A further recommendation of the Gas Committee was also adopted, to the effect that discounts be allowed to consumers settling their half-yearly accounts not later than Jan. 20 and June 20, at the following rates per 1000 cubic feet: Where the consumption is over 35,000 and under 50,000 feet, 1d.; over 50,000, 2d.; over 500,000, 3d.; over, 1,000,000, 4d.; over 2,000,000, 5d.; 4,000,000 cubic feet and upwards, 6d.

The valuation of Aberdeen has been made up at £867,371—which is a reduction of £4509 upon last year. There is a reduction upon the value of the Corporation gas-works of £4545, which accounts for more than the total decline in the valuation.

The story told by Mr. A. C. Young, the Engineer and Manager to the Arbroath Gas Corporation, at the ceremony of the inauguration of the new gasholder there on Thursday—a report of which appears elsewhere—is quite a romance in gas management. We have all known that since he went to Arbroath, a little over seven years ago, Mr. Young has been actively engaged in the reconstruction of the gas-works, and that he has been more than ordinarily successful in his management; but it will probably surprise most people to learn that practically the whole plant in the works had been renewed, and, more wonderful, that until this year, when £6000 or £7000—the cost of the new holder and new water-cooled condensers—has been placed to suspense account, all the outlays for renewals have been taken from revenue. They have practically a new gas-works without a capital account. The suspense account is expected to be wiped out in about three years. After that the Corporation will be free to apply themselves to a reduction of the capital sum standing against the works before the process of renewal began. This was a work which was not persevered in before. Beginning with 1871, when the transfer took place, the capital debt, including the capitalized value of annuities, mounted up to £77,737; and of this sum, only £11,000 odd has been redeemed. The conclusion seems inevitable that if the Corporation are able now to apply over £2000 a year in the reduction of indebtedness, they surely must have been somewhat remiss in that duty in former days. Most probably the right conclusion is that, for the ability to do what the Corporation are now doing, we must look to the management. Mr. Young has certainly inspired the confidence in him of the Corporation and of the community as well. The results he has been able to attain to are sufficient to justify the confidence reposed in him; and it is impossible to conceive of him looking upon the proceedings last Thursday in any other light than that of a triumph for the policy of management he has pursued. I, at any rate, must accord him that honour, and do it most heartily, for the unbroken advance he has made towards the position in which the Corporation gas-works now are. The new gasholder, which is his design, is a shapely structure, and to all appearance it merits all that was said of it.

In the Dumfries Town Council last week, the Gas Committee made several recommendations of more than usual importance. They recommended, among other matters, that £1500 be placed to the reserve fund out of the profits for the past year; that the Managers—Messrs. J. Smith and S. Dickie—be requested to prepare a report, with plans, upon the subject of a new retort-house and coal-store, retort-bench, and machinery for charging and discharging retorts, &c., to be submitted to an early meeting; that a deputation of their number be appointed to visit, along with the Managers, a number of gas-works in Scotland with a view to obtaining information which might be useful in the matter of improved retort-house and coal-storage accommodation and other matters; that plant for the distilling of tar be erected at a probable cost, as estimated by the Managers, of £200; that the prices of gas be reduced by 1d. per 1000 cubic feet, making them to ordinary consumers and for public lighting 2s. 10d., to prepayment meter consumers 3s. 4d., and for motive power 2s. 7d.; and that the same discounts be allowed as last year, subject to any change which may be agreed to by the Council after a report upon the subject by the Managers has been received and considered. All the recommendations were unanimously adopted.

In the Inverkeithing Town Council last week, a letter from the Secretary of the Inverkeithing Gas Company was read, in which it was stated that the Directors believed that the Town Council were not disposed to purchase the gas-works. They had been considering the necessity for enlarging the works; and he had been instructed to ask if the Council would be willing to grant a feu of a piece of vacant ground at Saltpans. The intention meantime was to place a gasholder there; but the idea was to have new works erected when the wants of the burgh demanded it. Mr. Craig asked if the Council could not erect works themselves at that place. The Town Clerk gave the ruling that he was afraid they could not without first adopting the Act, which they could not do without buying up the Company. Mr. Craig thought that, if the Company's proposal were serious, the Council should consider the question of buying up the undertaking. For every £100 the Company might spend now, the Council would have to pay


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£300 or £400 later on. The Company were not only considering the needs of the burgh, but were anticipating the requirements of Rosyth Naval Base. The Town Clerk said that at present the Company could not get the full use of their retorts, owing to the insufficiency of their present holder. The Council agreed to consider the subject in Committee. The Company is a very small concern, having only an annual output of 2 million cubic feet, and a capital of £1100; but, with the naval works in progress in the neighbourhood, there are certainly great possibilities.

The section of the inhabitants of Crossgates who were opposed to the lighting of the place being given to the Cowdenbeath Gas Company have written to the Dunfermline District Committee stating that they have presented their case in detail to the powers that rule in London, and to the Local Government Board, and pointing out that no power had been given to the Cowdenbeath Company to supply gas. It was also complained that the specifications which were approved of had not been carried out. There were to be forty street-lamps; while only 25 new and seven old ones were being fixed. This was considered neither honourable nor creditable to the gentlemen who composed the Council. Mr. R. W. Wallace, who presided at the meeting of the District Committee, said that their procedure had been quite regular. They received two offers. One was withdrawn; and fearing lest there had been some misunderstanding, they asked for fresh offers. One offer was received; and as it seemed reasonable, the District Committee approved of it, and remitted the arrangement of the details to the Local Committee. Some of the members of the Committee did not attend, and for this the District Committee were not responsible. When they had done their best to meet the circumstances of the case, he did not see that there was very much to complain of. The Committee approved of the action which had been taken.

The thirty-fifth annual meeting of the Nairn Gaslight Company, Limited, was held last week—Mr. J. Gordon, Chairman, presiding. The net profit for the year was £592. A dividend of 4 per cent. was declared, which absorbs £245. The make of gas during the year was 15,148,700 cubic feet.

The vote of the ratepayers of Carnoustie, taken last Saturday, upon the question of the adoption of the Burghs Gas Supply Act, resulted as follows: For, 555; against, 42—giving a majority in favour of the gas transfer of 513. Provost Walker has expressed his gratification that the ratepayers had backed up the Town Council.

The annual meeting of the St. Andrews Gas Company was held yesterday—Mr. A. Aikman, the Chairman, presiding. The balance-sheet showed the income to have been £9867, and the expenditure £8390; leaving a balance of £1436 available for final dividend. The Chairman, in moving adoption of the report, referred to the continued prosperity of the Company during the year. The Directors had agreed to abolish the rental on cookers, with the result that a large increase in the number of cookers and grills had taken place, and they fully anticipated this would result in increased profits. The Directors' report was adopted, and a dividend of £3 per share was declared.

## CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Sept.* 11.

**Sulphate of Ammonia.**

Demand has been well sustained throughout the week, and parcels offered have been readily placed at a further advance in prices. The closing quotations are, consequently, £11 6s. 3d. per ton f.o.b. Hull, £11 7s. 6d. per ton to £11 8s. 9d. per ton f.o.b. Liverpool, and £11 10s. per ton f.o.b. Leith. For delivery up to the end of the year, £11 10s. is about the value. For the first four to six months of next year, £11 15s. per ton is being quoted f.o.b. Leith, but this price has not been paid.

**Nitrate of Soda.**

The market remains very quiet at 9s. 6d. and 9s. 9d. per cwt. for ordinary and refined qualities respectively.

LONDON, *Sept.* 13.

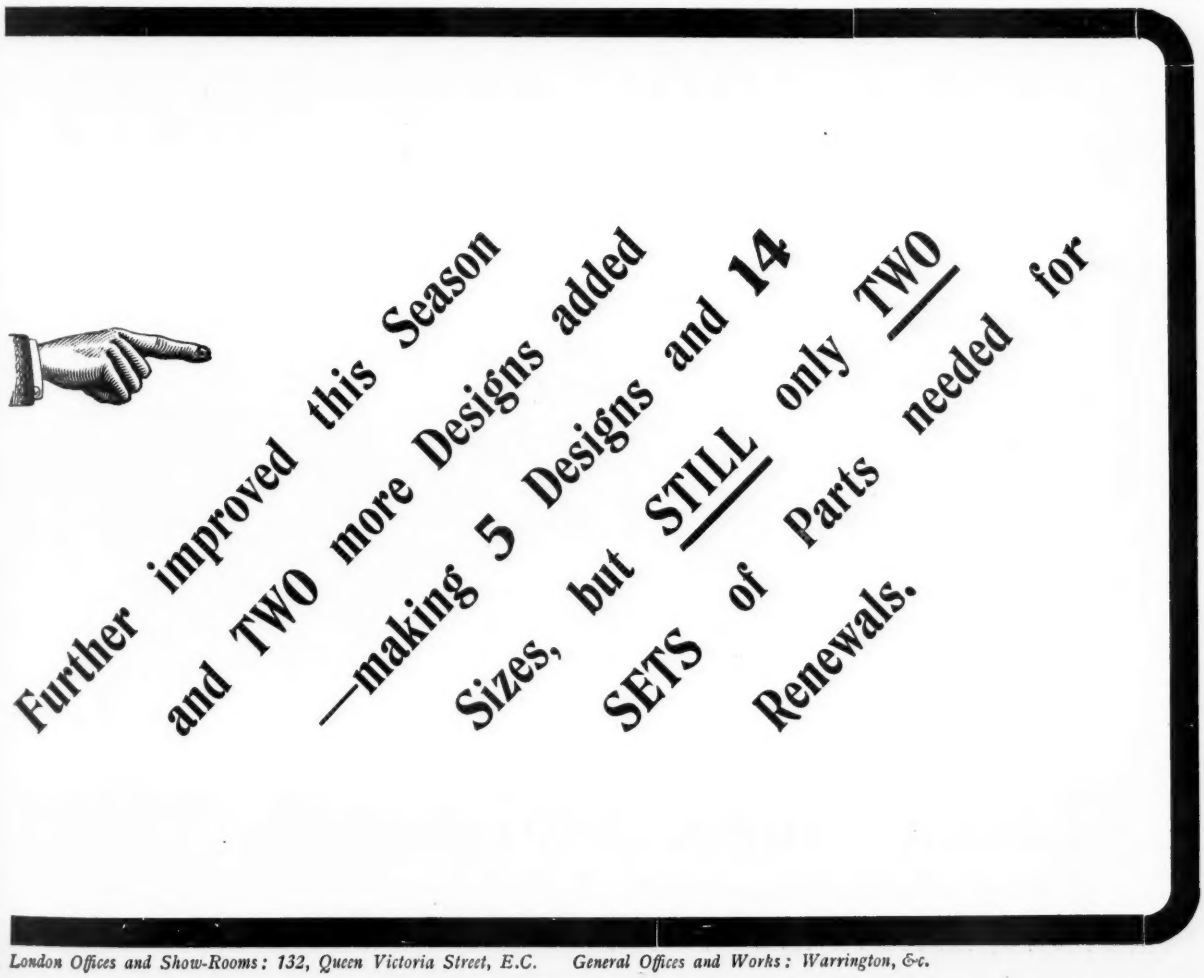
**Tar Products.**

The markets have been steady throughout the past week. Pitch is still exceedingly firm, and although prices have not actually advanced, makers are, if anything, firmer in their ideas. In South Wales there is a very good demand for prompt delivery, as well as for delivery to June next; while in some cases they are desirous of purchasing to the end of the year. Continental buyers are also coming more freely into the market. Creosote is exceedingly quiet, and orders are scarce. Benzols are steady; but prices are unchanged. Toluol is firm in the North for this year's delivery. Solvent is in fair demand. Carbolic is weak; and crystals are difficult of sale. Naphthalene is dull; but salts are in fair request. There is no alteration in anthracene.

The average values during the week were: Tar, 15s. 3d. to 19s. 3d. *ex* works. Pitch, London, 30s.; east coast, 29s. 9d. to 30s.; west coast, 28s. 6d. to 29s. 6d. f.a.s. Mersey ports, 28s. 6d. to 29s. f.o.b. others. Benzol, 90 per cent., casks included, London, 6¼d. to 6½d.; North, 5⅞d. to 6d.; 50-90 per cent., casks included, London, 7d. to 7¼d.; North, 6¾d. to 7d. Toluol, casks included, London, 9d.; North, 8⅜d. to 9d. Crude naphtha, in bulk, London, 3⅛d. to 3⅜d.; North, 3¼d. to 3½d.; solvent naphtha, casks included, London, 11d. to 11½d.; North, 10d. to 10½d.; heavy naphtha, casks included, London, 10½d. to 10¾d.; North, 9¾d. to 10d. Creosote, in bulk, London, 2⅝d. to 2¾d.; North, 2⅝d. to 2¾d. Heavy oils, in bulk, 2⅞d. to 2⅞d. Carbolic acid, 60 per cent., casks included, east coast, 10½d. to 10⅝d.; west coast, 10¼d. to 10½d. Naphthalene, £4 10s. to £8 10s.; salts, 35s. to 40s., packages included and f.o.b. Anthracene, "A" quality, 1½d. to 1⅝d. per unit, packages included and delivered.

**Sulphate of Ammonia.**

This market has been firm during the past week for prompt and forward delivery. The Gas Companies are quoting £11 10s. for prompt, and £11 12s. 6d., Jan.-June; Beckton, £11 2s. 6d.; London, £11 2s. 6d. The quotations at Hull are £11 5s. to £11 6s. 3d.; Liverpool, £11 6s. 3d. to £11 7s. 6d.; Leith, £11 10s. for prompt, and £11 2s. 6d. Jan.-June—some makers asking £11 15s. for forward.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## COAL TRADE REPORTS.

### Northern Coal Trade.

There has been some irregularity in the northern coal trade during the last few days; but, on the whole, the tone has been a little firmer. In the steam coal trade, the price is still low to what it was a few weeks ago. Best Northumbrians are from 10s. 7½d. to 11s. 3d. per ton f.o.b.; second-class steams are from 10s.; and steam smalls show a rather better demand, from 5s. to 6s. The output at the collieries is fairly good; but there are occasions when want of ready steamers at the ports has made a day's idleness inevitable. In the gas coal trade, the home demand is improving steadily; and there are heavier deliveries now on the long contracts, as well as fair exports. The quotation for Durham gas coals is from 10s. to 11s. 1½d. per ton f.o.b., according to quality, for the usual classes; and up to 11s. 7½d. for "Wear specials." More gas coals are now being sold for export to Italy, including two lots of about 50,000 tons each for delivery over next year. One of these, for second-class gas coals, sold for about 10s. 1½d. per ton f.o.b.; and the other, for best sorts, commanded very close to 11s. per ton f.o.b.—the possibilities of the Eight Hours Act having influence. Coke is firm, and gas coke unaltered. The latter is in heavier supply, with prices ranging from 12s. to 12s. 9d. per ton f.o.b.

### Scotch Coal Trade.

Business is quiet at home, and the shipping trade is falling off. Prices are not unaffected; and the prospect is that they will come still lower, though it may not be very much. The quotations now are: Ell 8s. 9d. to 10s. 3d., splint 10s. 3d. to 10s. 6d., and steam, 9s. 3d. to 9s. 6d. per ton f.o.b. Glasgow. The shipments for the week amounted to 295,458 tons—a decrease of 68,740 tons upon the previous week, and 36,484 tons upon the corresponding week of last year. For the year to date, the total shipments have been 10,184,594 tons—an increase of 618,706 tons upon the corresponding period.

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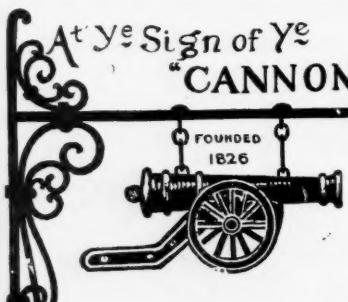
**Suction-Gas Plant for the Rosyth Naval Works.**—Messrs. Easton Gibb and Son, the Contractors for the naval works at Rosyth, have decided to erect a private central power station for the distribution of electric light and power throughout the entire works at Rosyth naval base; and an order has been given for the installation of four gas-engines and suction-gas plants with a maximum output of 1100 B.H.P. The engines are to run day and night continuously, supplying electric current at 500 to 550 volts to the various motors spread over this large area—the work to be done including quarrying, stone crushing, concrete mixing, the driving of machine shops and sawmills, pumping, &c. The suction-gas plants are to use gas coke for fuel, costing about 10s. per ton; and it is estimated that electricity will be obtained at a total cost of ⅜d. per Board of Trade unit, including all standing and working charges.

**Camborne Water Company's New Works.**—In taking the chair at the half-yearly meeting of the Camborne Water Company, Mr. W. C. Pendarves referred to the difficulty which had been experienced, owing partly to dry weather, in supplying the outlying portions of the district. The demand was very heavy at Camborne; and undoubtedly the supply at Illogan had been very short. The Directors hoped that the new works which were being carried out would remove all cause of complaint. There was a good deal of waste of water, which it was difficult to stop. The works which were being undertaken at Boswyn had been satisfactorily accomplished; and the new reservoir was likely to increase the supply of water. The revenue for the half year (£1880) was £127 more than in any corresponding period; but, on the other hand, the expenditure was more by £157, owing to the large amount of pumping required. It was decided to pay dividends of 8 per cent. on the "A" shares and £5 12s. per cent. on the "B" shares, which would absorb £724 of the revenue of £902, and leave £178 to be carried forward. At an extraordinary meeting which followed, the Directors were empowered to raise £8333 by the issue of debentures; this being one-third of the additional capital authorized by the Company's new Act.

**Falmouth Water Supply.**—A discussion took place at the meeting of the Falmouth Town Council last Thursday respecting the water supply. Mr. Fox, on behalf of the Water Committee, expressed the opinion that they were getting as good a supply as they could expect. The Water Company were doing as much as was possible without buying fresh land to increase the storage. When the works now in progress were completed, the storage would be very much larger. In the meantime, if there was a continuance of dry weather, consumers would have to be careful, or it would be necessary to further curtail the supply. There were complaints of a great deal of waste. Mr. H. S. Johns said the officials of the Water Company told them that the quantity of water used per head was greater in Falmouth than in most towns. It was hoped that, with the additional provision for storage, and an average rainfall during the winter, it would not be necessary to curtail the supply in future to the same extent as in the past. A letter was read from the Company pointing out that, in spite of the very dry winter and summer, the water had not been cut off in the daytime; and the only sufferers of inconvenience from the curtailment had been persons who had neglected to fit storage tanks on their premises. Owing to the reckless waste of water and carelessness on the part of the consumers, the consumption was very much above the average of other towns. At no time since the great drought of 1887 had the domestic supply been curtailed during the daytime; and this, added the letter, was not a bad record for any Company. The Mayor (Mr. F. J. Bowles), who is Manager of the Water Company, said the drought this year was very exceptional; and it was a matter for congratulation that the supply had not been curtailed during the day. Mr. Harris expressed the fear that the reputation of Falmouth would suffer in regard to its water supply. Mr. Fox said much of the difficulty was due to the dry weather. The Water Committee were agreeably surprised at what the Company had been doing.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**Plymouth Water-Works Accounts.**—The Borough Treasurer of Plymouth submitted to the Finance Committee at their last meeting a statement of accounts for the year ending March 31. This showed that on revenue account the income was £32,481, of which £18,712 was from water-rentals and £12,622 from sales of water by meter. The expenditure was £10,735; the chief items being wages £3151; rates, taxes, &c., £4158; works and maintenance, £2547; and establishment expenses, £582. The gross profit for the year was £21,745; and after allowing £10,012 for dividends and interest, £5269 for stock and mortgages redemption, and £997 for repayment of loans, there was a balance of £5467, which was the net profit. On capital account, there was an expenditure of £8842; the greater part of this (£6945) being for the duplication of a portion of the trunk main supplying the town.

**Cheaper Gas for High Wycombe.**—The Directors of the High Wycombe Gaslight and Coke Company, Limited, state in their report for the half year to June 30 that they feel justified in recommending a reduction of 2d. per 1000 cubic feet in the price of gas, as from Oct. 1 (making the rate 4s., with the usual discounts for prompt payment), and an increase in the dividend to 9 per cent. per annum on the ordinary capital and £6 6s. per cent. on the additional capital. After payment of interest on debentures, and providing for the preference dividend, there remains a sum of £2540 available for distribution; and when the increased dividends alluded to have been paid, there will be a balance of £1714 to carry forward. The Manager (Mr. Harold Baker) has received tangible proof of the satisfaction of both Directors and shareholders with his efforts on behalf of the undertaking.

**Droitwich Mainlayer's Death.**—Somewhat curious circumstances surrounded the death of Edward Price (aged 47), who was formerly in the employ of the Droitwich Corporation Gas Department. From the evidence tendered at the inquest, it appeared that, as long ago as last November, deceased was engaged with a man named Harrison (who died not very long after the accident) in tapping a gas-main, when both men were overcome. Price was removed unconscious, but was not attended by a doctor; and subsequently he returned to work. Three months ago, however, he became very ill, and got gradually worse until he died. Mr. F. Shewring, the Manager, said that Price returned to work the morning after the accident. The foreman (Harrison) was supplied with bladders; but the use of them was left to his discretion. The doctor who attended deceased stated that there was some valvular trouble of the heart, quick pulse, difficulty in breathing, great emaciation, and partial paralysis of the lower extremities. He formed the opinion that at the time of the accident the heart and lungs were damaged by the temporary suffocation. The lungs since the accident had taken up oxygen insufficiently; and the diminished supply of oxygen would act much as a diminished supply of food, causing the emaciation. The heart strain at the time of the accident would give rise to valvular mischief. Slight effusion into the spinal canal would cause the partial paralysis in the lower extremities. He was of the opinion that death was the result of the accident. There was no other disease. The Jury found that deceased died from the results of suffocation by gas.

**A Low Price at Plymouth.**—The Plymouth and Stonehouse Gas Company give notice of a reduction of 1d. per 1000 cubic feet in the price of gas, which will then be 1s. 9d. per 1000 cubic feet.

**Reduction in Price at Teignmouth.**—At a meeting last Tuesday, the Teignmouth Urban District Council adopted a recommendation of the Gas Committee that the price of gas be reduced to 3s. 3d. per 1000 cubic feet as from June 30 last, and that a proportionate reduction be made in the charge for public lighting.

**Paignton Water-Works Contract.**—Subject to its ratification by the District Council, an agreement has been reached in the dispute respecting the Contractors' claim for the execution of the Paignton water-works scheme. The Contractors (Messrs. Hawkings and Best originally claimed the sum of £130,941; but this was reduced to £86,101. The Council paid during the progress of the works £46,341; and Messrs. Hawkings and Best claimed £39,760 as the balance due to them. Mr. Vanstone, as Arbitrator, took evidence for and against the claim. Last week there was a conference at the offices of the Contractors' Solicitors, at which it was agreed that Messrs. Hawkings and Best should receive £10,000 in full settlement of their claim. This sum is to include £4000 retention money held by the Council. Each party will pay its own costs of the arbitration.

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The Board of the James Keith and Blackman Company, Limited, recommend a dividend for the year of 5½ per cent. on the preference shares—carrying forward £2301.

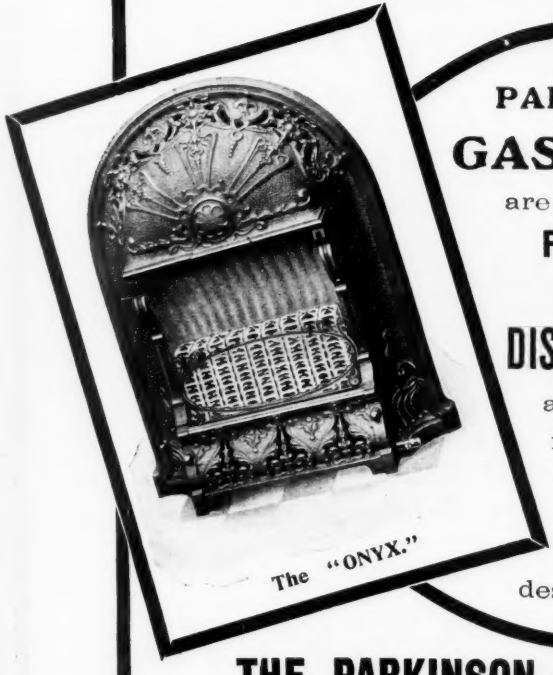
At Mossley it has been resolved, on the recommendation of the Manager (Mr. J. Taylor), to arrange for the cleaning and regulating of consumers' gas fires and stoves throughout the district at a charge of 6d. each.

The Bland Light Syndicate, of No. 29, Little Trinity Lane, E.C., are issuing a fresh catalogue which, besides containing illustrated particulars and prices of their well-known burner, gives some attractive new designs of inexpensive and artistic gas-fittings and glassware, together with details of incandescent accessories, slot-fittings, and general gas-works appliances.

Mittons Fittings, Limited, is the title of a Company registered with a capital of £1500, in £1 shares, to acquire a patent relating to suspension fittings for inverted gas-burners, to adopt an agreement with D. Mitton, and to carry on the business of manufacturers of, and dealers in, fittings used in connection with inverted gas-burners and electric lamps of the incandescent type, &c.

The Thames Conservators have issued a circular to District Councils calling their attention to discharges of an objectionable character from surface-water drains. The Conservators state that they are advised that the increasing use of oily and tarry substances for dust prevention will prove detrimental to the river and subsidiary streams; and they request the Councils to take precautions accordingly.


PARKINSON

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The models of the "St. Andrew" gas-radiator that Messrs. Wright introduced last year, and sent out to some of the most important gas undertakings, met with such favour that this year it has been decided to make them in more considerable numbers, so as to give other gas authorities the means of showing, in a convenient form, the appearance and principles of this well-known apparatus. The models are under 10 inches high; and all the various fittings are shown in the correct position and proportion.

Considerable prominence has been given in the Scottish Press to Lord Reay's address at the opening of the South of Scotland Technical College, Galashiels, last Saturday week. The building is lit throughout with gas; the "Telephos" system of electric ignition having been adopted on the recommendation and to the specification of Mr. Daniel Macfie, of Edinburgh. In this somewhat unique installation, over 150 upright incandescent "Telephos" burners are employed; and the work has, it is said, been satisfactorily carried out by a local firm.

A speciality is made by Messrs. Isaac Eales and Co., of No. 40, Howard Street, Birmingham, of the "Forto" gas-mantles, which are stated to be durable and to possess good lighting qualities. The greatest care is exercised in the manufacture of these mantles; and every one is turned out under the personal supervision of the proprietor. For the forthcoming season's trade, the firm have a complete range of patterns, from the cheap varieties to the more expensive forms for use with high-pressure burners and self-intensifying lamps. They also offer various pattern gas-burners of neat appearance, together with all accessories. Messrs. Eales make a point of the fact that they are the only actual manufacturers of incandescent gas-mantles in Birmingham.

We have received from the Correspondence College Company, of No. 26, Green Street, Cambridge, and Gaywood, Norfolk, a copy of "The Success Book—Kalendar 1909-10." The objects of the Company are stated in the following terms in the course of an introduction: "The College was formed to provide students with correspondence tuition in the practical, as well as theoretical, side of the various branches of engineering technology and commerce. There are many institutions and tutors who provide tuition, but only on the theoretical side. This, however, is not sufficient in this practical age. The practical side must, therefore, be emphasized more than the theoretical. The granting of engineering degrees by the different universities is a proof of this. The London University is the only college granting an engineering degree to external students; and these must, perforce, be prepared by correspondence tuition. This also applies to the surveying, electrical, gas, architectural, and other branches of engineering. To meet this want, our courses were instituted, and an efficient staff of practical engineers engaged to prepare the lectures and notes. Only men with extended practical experience, combined with high honours in theoretical training, were engaged, thus ensuring certain success to the student. The College is entirely devoted to correspondence work; and so giving the student undivided attention—a *sine quâ non* for successful work. It is the intention of the Council to provide laboratories and workshops in the near future, in order that those who have spare time may take up courses of practical work." The book gives particulars of the various examinations, as well as the College's own diploma courses.

## APPLICATIONS FOR LETTERS PATENT.

19,794.—Peck, W. W., "Recovering ammonia from crude ammoniacal liquors." Aug. 30.

19,812.—Jones, A. O., "Discharging and conveying away the coked product from vertical coke-ovens or gas-retorts with base discharge." Aug. 30.

19,852.—Spencer, H. J., "Heat radiator for use with gas-burners." Aug. 30.

19,904.—Hamblin, W. E., "Bye-pass burner." Aug. 31.

19,924.—Lumsden, T., "Gas-producers." Aug. 31.

19,935.—Ehrich and Graetz, "Automatic lighting and extinguishing devices for gas-lamps." Aug. 31.

19,941.—Sparks, E., "Clockwork-controlled devices for lighting and extinguishing gas-burners." Aug. 31.

19,949.—Imer, E., "Reflectors with closed globe." Aug. 31.

19,958.—Wolfson, R., "Incandescent burner-fittings." Aug. 31.

19,959.—Koppers, H., "Obtaining bye-products in the dry-distillation or gasification of fuel." Aug. 31.

19,962.—Boult, A. J., "Gas-burners." A communication from F. Yockey and J. H. Jones. Aug. 31.

19,984.—Hansford, J., and Wright, A. C., "Meter attachments." Sept. 1.

19,990.—Leask, H. N., "Treating gases with liquids." Sept. 1.

20,012.—Piper, E. J., "Acetylene generators." Sept. 1.

20,017-8.—Cowper-Coles, S. O., "Reflectors." Sept. 1.

20,019.—Cowper-Coles, S. O., "Lamps or lanterns." Sept. 1.

20,023.—Cowper-Coles, S. O., "Lamps." Sept. 1.

20,031.—Fletcher, E., "Compression of gas or air for lighting or heating purposes." Sept. 1.

20,042.—Davis, H. N., and Twigg, W. R., "Gas-fires." Sept. 1.

20,044.—Wakefield, C. C., "Acetylene generators." Sept. 1.

20,060.—Altmann, F., "Inverted burners." Sept. 1.

20,072.—Graham, J., A., Jun., & D. A., "Fluid-pressure reducing valves." Sept. 2.

20,074.—Gibbs, A., "Gas-stove jacket-boiler." Sept. 2.

20,158.—Tozer, C. W., "Distillation, carbonization, and the like of coal and other carbonaceous material." Sept. 3.

20,187.—Wilson, H., "Gas-fire and fuel." Sept. 3.

20,202.—Szàm, S., "Tube scraper." Sept. 3.

20,237.—Simpson, W. S., "Manufacture and purification of coke." Sept. 3.

20,254.—Moore, W. G., "Retort." Sept. 4.

20,266.—Hoyle, J. C., and Hall, H., "Gas-burners." Sept. 4.

20,292.—Moeller, J., "Heating and lighting by gas." Sept. 4.

20,304.—Fichet, A., and Heurtey, R., "Gas-generators." Sept. 4.

20,309.—Glover, S., and West, J., "Distillation of coal in vertical retorts." Sept. 4.


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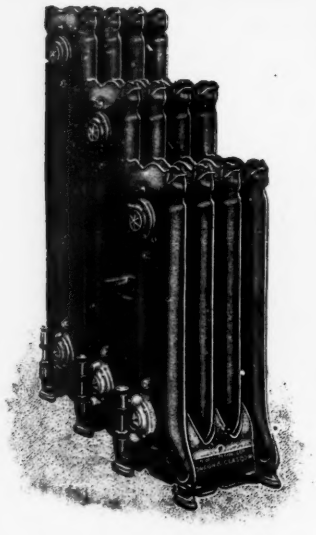

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Gas Offices, Gas-Works,
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Firth Blakeley's, Thornhill, Dewsbury.

MARKET HARBOROUGH URBAN DISTRICT COUNCIL.
(Gas Department.)
SURPLUS TAR.
**TENDERS are invited for the Surplus**
TAR produced during the Year ending Sept. 30, 1910.
Particulars may be obtained from the undersigned, to whom sealed Tenders, endorsed "Tender for Tar," must be delivered not later than noon on Monday, the 27th inst.
Alfred T. Harris,
Manager and Secretary.
Gas Offices, Market Harborough,
Sept. 10, 1909.

COUNTY BOROUGH OF BOLTON.
(Gas Department.)
COKE.
**THE Bolton Corporation Gas and**
Lighting Committee invite OFFERS for the Purchase of any portion of the Surplus GAS COKE, fork-filled (about 20,000 Tons), to be produced at their Gas-Works during the Year ending Sept. 30, 1910.
The Coke will be delivered into the Contractors' Waggons at the Craddock Lane or Bullfield Siding (L. & Y. Railway), Bolton, and must be removed in as nearly equal weekly quantites as is reasonably practicable.
Sealed Tenders, endorsed "Coke," stating Quantity proposed to be Purchased and Price offered per Ton, to be addressed to the Chairman of the Gas and Lighting Committee, Gas Offices, Bolton, and to be delivered not later than Thursday, the 30th of September, 1909.
Samuel Parker,
Town Clerk.
Town Hall, Bolton,
Sept. 10, 1909.

### SHEPPY GAS COMPANY.

**THE Directors invite Tenders for the** Purchase of the whole of their Surplus COKE (estimated at about 2000 Tons), or for part thereof, which will be produced between the 1st of October, 1909, and the 30th of September, 1910. Rail and Water facilities.

Tenders to be sent in, to the undersigned, not later than Wednesday morning, the 29th inst.

The Directors do not bind themselves to accept the highest or any Tender.

H. BARBER,
Secretary and General Manager.

Gas Offices, 22, Edward Street,
Sheerness, Sept. 2, 1909.

### COUNTY BOROUGH OF BLACKPOOL.
(GAS DEPARTMENT.)

**THE Gas Committee are prepared to re-** ceive TENDERS for the Surplus TAR produced during the next Twelve Months, from Sept. 30, 1909, to Sept. 30, 1910.

Particulars may be had from the undersigned.

Tenders, endorsed, to be sent, addressed to the Chairman, by the 25th inst.

By order,
JOHN CHEW,
Engineer.

Gas Offices, Princess Street,
Blackpool, Sept. 8, 1909.

### COKE.

**THE Directors of the Wandsworth and** Putney Gaslight and Coke Company invite TENDERS for the Removal of about 10,000 Tons of Guaranteed "WANDSWORTH" COKE from their Works at Wandsworth between Oct. 1 next and March 31, 1910.

The Coke to be removed by Van or by Barge (free waterway on River Thames).

Sealed Tenders, endorsed "Tender for Coke," to be delivered not later than the 17th of September.

The Directors reserve to themselves the right to accept any Tender in part or in whole, and do not bind themselves to accept the highest or any Tender.

Any further Information may be obtained from the Engineer, Mr. H. O. Carr.

CHAS. W. BRAINE,
Secretary.

Wandsworth and Putney Gaslight
and Coke Company,
Fairfield Street, Wandsworth, S.W.
Aug. 25, 1909.

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**THE Directors invite Tenders for the** Supply and Erection of a set of Six Cast-Iron PURIFIERS, 40 ft. by 30 ft. by 6 ft., together with Valves, Connections, Oxide Elevators, &c.

Copies of the Specification and Drawings can be obtained on and after Wednesday, the 1st day of September next, on Payment of One Guinea.

Tenders, addressed to the undersigned, to be delivered on or before Wednesday, the 22nd day of September next.

The Directors do not bind themselves to accept the lowest or any Tender.

R. O. PATERSON,
Engineer and Manager.

Gas-Works, Cheltenham,
Aug. 25, 1909.

### CORPORATION OF GLASGOW.
(GAS DEPARTMENT.)

**THE Corporation invite Tenders for** Supplying the following MATERIALS as may be required by the Gas Department for Twelve Months from date of acceptance—viz.:

1—Birch Brooms.
2—Brass Couplers and Stop Cocks.
3—Cast-Iron Pipes and Special Castings.
4—Cast-Iron Retort Mountings and other Castings.
5—Cast-Iron Screwed Saddles, and Double Faucet Stop Cocks.
6—Corks and Bungs.
7—Gas Hotplates for Kitchen Ranges.
8—Gun-Metal, &c., Castings.
9—Hay.
10—Limestone.
11—Malleable Iron Tube and Fittings.
12—Malleable and Cast Steel Castings, Bogie Wheels, and Rake Heads.
13—Meters, Ordinary and Prepayment.
14—Meter Boards and Wood Rhones.
15—Tin Pans and Grids.

ALSO TENDERS FOR:—

1—Cartage of Ashes, &c., at Provan and Tradeston Gas-Works.
2—Cartage for Street Mains and Workshops Departments.

Specifications and Forms of Tender may be obtained, and Samples Examined, on Application to Mr. Alex. Wilson, Gas Engineer, 45, John Street, Glasgow.

Sealed Tenders, marked outside "Gas Department, Tender for ———," must be lodged with the Subscriber, on or before Tuesday, the 21st of September current.

The lowest or any Tender may not be accepted.

A. W. MYLES,
Town Clerk.

City Chambers, Glasgow,
Sept. 9, 1909.

**THOMAS DUXBURY & CO.,**
**16, DEANSGATE, MANCHESTER,**
**Gas Engineers' Agents and Contractors for**
**METERS, FIRE-CLAY GOODS, OXIDE OF IRON AND ALL OTHER GAS APPARATUS.**
*Inquiries Solicited.*
Telegrams: "DARWINIAN, MANCHESTER."
Telephone 1806.

### SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

**MESSRS. A. & W. RICHARDS beg to** notify that their SALES BY AUCTION of NEW CAPITAL ISSUED UNDER PARLIAMENTARY POWERS, and of STOCKS and SHARES belonging to EXECUTORS and other PRIVATE OWNERS in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES, take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.

Terms for Issuing New Capital, and also for including other Gas and Water Stocks and Shares in these Periodical Sales, will be forwarded on Application to MESSRS. A. & W. RICHARDS, at 18, FINSBURY CIRCUS, E.C.

### TONBRIDGE WATER-WORKS COMPANY, LIMITED.

ISSUE OF 100 £5 "C" SHARES BY TENDER.
AS AUTHORIZED BY THE TONBRIDGE WATER-ORDER OF 1900.

**THE Directors of the Tonbridge Water-** Works, Company, are prepared to receive APPLICATIONS for the above on or before Oct. 1, 1909.

Particulars, with Form of Tender, can be obtained on Application to the Secretary, JAMES LEES, 4, The Terrace, TONBRIDGE.

### BRIXHAM GAS COMPANY.

SALE OF 200 7 PER CENT. ADDITIONAL ORDINARY SHARES OF £10 EACH.

**MR. S. F. Dugdall is instructed by the** Directors to SELL BY AUCTION, at the Town Hall, Brixham, Devon, on Thursday, the 30th of September, 1909, at Six p.m. precisely, in Separate Lots, 200 ADDITIONAL ORDINARY SHARES of £10 each, entitling the Holders to a standard dividend of 7 per Cent. (subject to the Sliding-Scale based on the Price of Gas).

The Standard Price of Gas is 4s. per 1000 Cubic Feet.

The Company was established in 1838 and incorporated by Special Act of Parliament on the 24th of June, 1904, and supplemented by the Brixham Gas and Electricity Act, 1906.

The Capital now being issued is required to meet expenditure in respect of Various Extensions.

Detailed Particulars of Sale obtainable post free from the OFFICES of the Company, Fore Street, BRIXHAM; W. A. SCHULTZ AND CO., Chartered Accountants, 50, Cannon Street, LONDON, E.C.; Mr. W. L. PARSONS, Solicitor, Brixham, DEVON; and the AUCTIONEER, Mr. S. F. DUGDALL, Brixham, DEVON.

Sept. 1, 1909.

### BOROUGH OF PORTSMOUTH WATER-WORKS COMPANY.

Third Sale under the Company's Act, 1906.
IMPORTANT SALE OF NEW ISSUE OF SHARES
IN THIS OLD-ESTABLISHED AND GOOD DIVIDEND-PAYING COMPANY.

**KING AND KING beg to announce** that they are favoured with Instructions from the Directors of the above-named Company to SELL BY PUBLIC AUCTION, at their Sale Rooms, 46, Commercial Road, Portsmouth, on Wednesday, Oct. 20, 1909, at Seven o'clock in the Evening (in convenient Lots), the Third Portion of a New Issue authorized under "The Borough of Portsmouth Water-Works Act, 1906," consisting of

2000 SHARES OF £5 EACH

(fully paid), forming part of the New Ordinary Capital authorized under such Act.

The Auctioneers desire to call the special attention of Capitalists, Investors, and others to this very favourable opportunity of securing Shares in such a thoroughly sound Local Company.

The Shares will be sold Free of any Charges, Fees, or Expenses whatever to the Purchaser.

Full Particulars and Conditions of Sale may be obtained, with any further Information, from the Secretary of the Company, J. L. WILKINSON, Esq., F.C.I.S., at the Company's Offices, Commercial Road, PORTSMOUTH; or of the AUCTIONEERS, at their Offices, 46, Commercial Road, PORTSMOUTH; 20, Palmerston Road, SOUTHSEA; and "Magdala House," SOUTH HAYLING.

National and Municipal Telephones—No. 12.
Telegraphic Address—"Kings, Portsmouth."

### BRITISH GASLIGHT COMPANY, LIMITED.

**NOTICE is Hereby Given, that the** HALF-YEARLY ORDINARY GENERAL MEETING of the Proprietors of this Company will be held at this Office on Wednesday, the 29th inst., at Twelve o'clock precisely, to transact the usual Business; to declare a Dividend for the Half Year ended the 30th of June last; to elect two Directors in the place of those who go out by rotation; and to appoint two Auditors.

AND NOTICE IS HEREBY ALSO GIVEN, that at such Meeting a Resolution will be submitted to the Proprietors dealing with the payment by the Company of Income Tax in respect of the Remuneration of the Directors and Auditors.

The TRANSFER BOOKS of the Company WILL BE CLOSED on the 18th inst. and RE-OPENED on the 30th inst.

By order of the Court of Directors,
A. W. BROOKES,
Secretary.

Chief Office: No. 11, George Yard,
Lombard Street, London, E.C.
Sept. 8, 1909.

*Testing Instruments*
**ALEXANDER WRIGHT & CO., LD.**
**WESTMINSTER.**

**Price 3s. 6d. net.**

**MODERN METHODS OF SAVING LABOUR IN GAS-WORKS**
(WITH SIXTY ILLUSTRATIONS),
BY
**C. E. BRACKENBURY, Assoc.M.Inst.C.E.,**
**Barrister-at-Law.**
Being a Reprint of Six Articles contributed to the "ENGINEERING TIMES."

I. Historical and General Introduction.
II. Inclined Retorts.
III. Stoking Machinery for Horizontal Retorts.
IV. Coke Plant.
V. Carburetted Water-Gas Plant.
VI. Purifying Plant.

London: WALTER KING, 11, Bolt Court, Fleet St., E.C.

**MUNICH**
**INCLINED CHAMBERS.**
*Sole Agents and Licensees for Great Britain and Colonies:*
**The Coke Ovens & By-Products Co., LTD.,**
**Palace Chambers,**
**Westminster, LONDON, S.W.**

**The Manufacturers of the best and cheapest**
**GAS QUICK HEATERS**
**are**
**OTTO LOEB & CO.,**
**BERLIN, S.W.61.**
*Ask for Samples and Price List.*

**HEATHCOTE GAS COAL**
**from the**
**GRASSMOOR COLLIERIES,**
**CHESTERFIELD.**
**Rich in Illuminating Power and Yield of Gas.**
**Above the Average in Weight and Quality of Coke.**
**Maintains a High Standard in Residuals.**

**MIRFIELD GAS COAL.**
**UNEQUALLED.**
**Sperm Value 878·85 lbs. per Ton.**
*Please apply for Price, Analyses, and Report, to the*
**MIRFIELD (GAS COAL) COLLIERIES**
**RAVENSTHORPE, NEAR DEWSBURY.**
**LONDON: 16, Park Village East, N.W.**

**JAMES OAKES & CO.,**
**ALFRETON IRON-WORKS, DERBYSHIRE,**
AND
**Wenlock Iron Wharf, 21 & 22, Wharf Road, CITY ROAD, LONDON, N.**
Manufacture and keep in Stock at their Works (also large Stock in London)
PIPES and CONNECTIONS, 1½ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS, and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.
NOTE.—Makers of HORSLEY SYPHONS. These are cast in one piece, without Chaplets; doing away with Bolts, Nuts, and Covers, and rendering Leakage impossible.

**BIRTLEY IRON COMPANY,**
ESTABLISHED 1820,
Owners of the Birtley Iron Works and Pelaw Main Collieries,
**GENERAL ENGINEERS & IRONFOUNDERS.**
Makers of Cast-Iron PIPES and CONNECTIONS for Gas, Water, Steam, Electrical, Sanitary, and other purposes; also TANKS, COLUMNS of every description, Hydraulic, Gas, and Colliery PLANT, &c.
Illustrated Catalogue, giving complete list of our manufactures, on application.
Works: BIRTLEY, CO. DURHAM.
London Offices:
**46, CANNON STREET, E.C.**
Newcastle-on-Tyne Offices: MILBURN HOUSE.

**MIDLAND ENAMELLING CO.,**
Manufacturers of
**DIALS** (Enamelled)
For Gas, Water, Electric, &c., Meters.
**DIALS**
For Pressure Scales in One Length up to 4 feet.
**DIALS**
For Clocks, Barometers, Thermometer Indicators, and for every purpose.
140, Finch Rd., Handsworth, Birmingham.

**NEWBATTLE CANNEL.**
Highest Results in Gas, & Excellent Coke.
QUOTATIONS ON APPLICATION TO
**THE LOTHIAN COAL COMPANY,**
LIMITED,
NEWBATTLE COLLIERIES,
**NEWTONGRANGE, MIDLOTHIAN.**

**ALL** the
**BOYS CALORIMETERS**
which have been in daily use in all the Official Testing-Stations in London for the last Three Years
WERE MADE BY
**JOHN J. GRIFFIN & SONS,**
— LIMITED, —
**KINGSWAY, LONDON, W.C.**
Those desiring to obtain **Gas Calorimeters** as used in the **Official Testing Places** should see that the apparatus bears the name of the Original makers.
*Descriptive Catalogue on Application.*

**TROTTER, HAINES, & CORBETT,**
BRETTELL'S ESTATE, LIMITED,
**FIRE-CLAY & BRICK WORKS,**
**STOURBRIDGE.**
Manufacturers of GAS RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.
Special Lumps, Tiles, and Bricks for Regenerative and Furnace Work.
SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.
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**SHEAF WORKS, SHEFFIELD,**
MANUFACTURERS OF
**FILES OF BEST QUALITY**
FOR ENGINEERS.
**STEEL OF ALL DESCRIPTIONS.**
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ANVILS, VICES,
AND ENGINEERS' TOOLS GENERALLY.
*London Office:*
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**CAST-IRON PIPES** FOR GAS, WATER, & STEAM,
also VALVES of all descriptions.
**R. LAIDLAW & SON, LTD.,**
ALLIANCE FOUNDRY, 147, MILTON STREET, GLASGOW,
And LAMBHILL FOUNDRY, GLASGOW.
OFFICE: 147, MILTON STREET, GLASGOW.

**Rheinische Chamotte-und Dinas-Werke, Cologne on Rhine.**
Construction of
**Entire Gas-Works & Coke Oven Plants,**
*Retort Furnaces,*
**Furnaces for Chamber Settings** (*Patent*), **New Coke Ovens** (*Patent*),
With and without Recovery of the Bye-Products, Tar and Benzol Distilleries, Ammonia Works, and Cyanogen Extraction Plants.

N.B.
**MOBBERLEY & PERRY, LTD.,**
Gas Retort, Fire-Clay, Red and Blue Brick Works,
**STOURBRIDGE,**
Manufacture best quality only of every description of Inclined, Horizontal, and Segment Retorts, Lumps, Blocks, Water-Gas Blocks, and Checker Bricks.

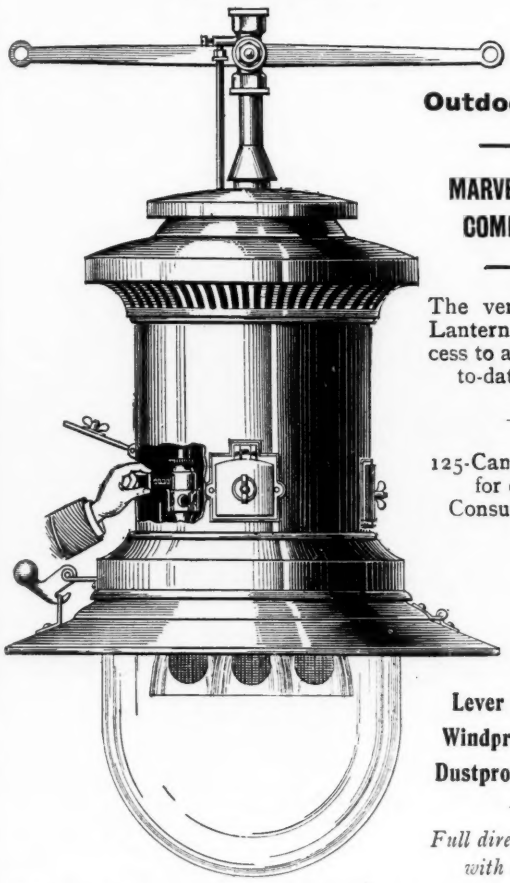
# B. CARS,

*VENUS LAMP WORKS,*
**124-130, Tabernacle Street, and 91-93, Paul Street, Finsbury, LONDON, E.C.**

Telegrams—"LIMELIGHTS, LONDON." Telephones—9134 LONDON WALL; 10,331 CENTRAL.

## "VENUS LANTERNS,"

"OUTDOOR" Lamps.



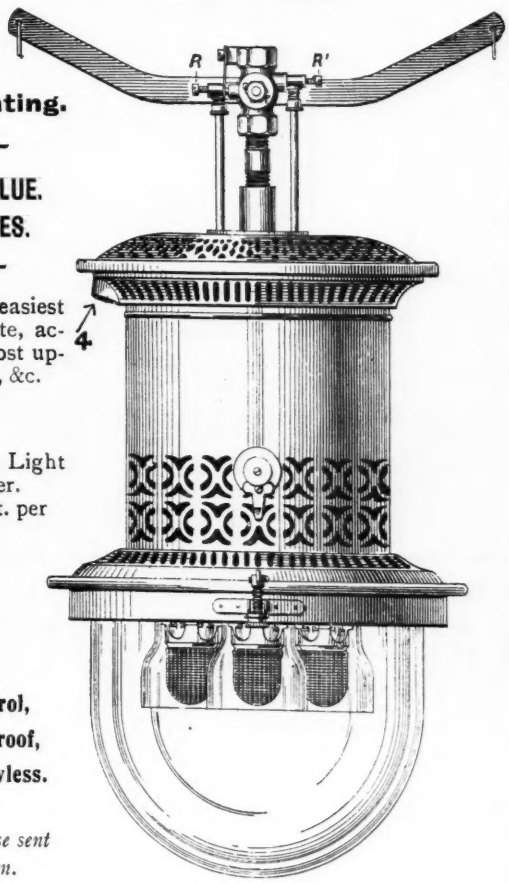
**For Indoor and Outdoor Lighting.**

**MARVELLOUS VALUE. COMPARE PRICES.**

The very latest, easiest Lantern to regulate, access to all parts, most up-to-date Lantern, &c.

125-Candle Power Light for each Burner. Consumption 4 ft. per Burner.

"INDOOR" Lamps.




**Lever Cock Control, Windproof, Rainproof, Dustproof, Shadowless.**

*Full directions for use sent with each Lantern.*

Highest grade black enamel finish Lanterns, priced complete with **"Venus-Cyclop"** XX Mantles, **Jena** Inner Chimneys, best Imperator Quality Globes.

**G9030. 1-Light,** 125 Candle Power. ⅜ in. Inlet, 14 in. Reflector, 21 in. Overall, **28s.** each.
**G9031. 2-Light,** 250 Candle Power. ⅜ in. Inlet, 17 in. Reflector, 24 in. Overall, **49s.** each.
**G9032. 3-Light,** 375 Candle Power. ½ in. Inlet, 17 in. Reflector, 27 in. Overall, **62s.** each.
**G9033. 4-Light,** 500 Candle Power. ½ in. Inlet, 19 in. Reflector, 31 in. Overall, **83s.** each.
**G9034. 5-Light,** 625 Candle Power. ½ in. Inlet, 19 in. Reflector, 33 in. Overall, **94s.** each.

Highest grade white enamel finish Lanterns, priced complete with **"Venus-Cyclop"** XX Mantles. **Jena** Inner Chimneys, best Imperator Quality Globes.

**G9035. 1-Light,** 125 Candle Power. ⅜ in. Inlet, 14 in. length Overall, **27s.** each.
**G9036. 2-Light,** 250 Candle Power. ⅜ in. Inlet, 16 in. length Overall, **47s.** each.
**G9037. 3-Light,** 375 Candle Power. ½ in. Inlet, 18 in. length Overall, **55s.** each.

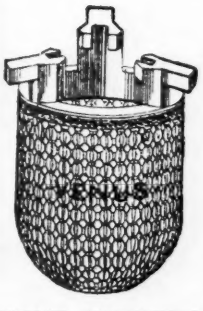
***Subject to 50 per cent. Trade discount. Enquiries solicited.***

## Upright and Inverted "VENUS" Mantles

**ARE STILL THE BEST.**

Require also no extravagant statements for selling purposes.

**PRICES ON APPLICATION.**




**BEST VALUE and PATTERNS in FANCY GLOBES FOR INVERTED and UPRIGHT BURNERS.**

**Lowest Prices. Ready for immediate delivery from London Stock. New Catalogues ready shortly.**

# PODMORE'S PATENT SELF-INTENSIVE INTERIOR LAMPS.

The "IVEX" No. 6001 G.L.

Reversible. Can be converted to an upright Intensive Lamp.

5 S Series.

Intensive Inverted Lamp. High Efficiency.

## DUST AND INSECT PROOF BUNSEN BURNERS.

6 A Series.

Suitable for all Trades.

Especially suitable for India and the Colonies.

## A. E. PODMORE & CO.,

**34, Charles Street,**

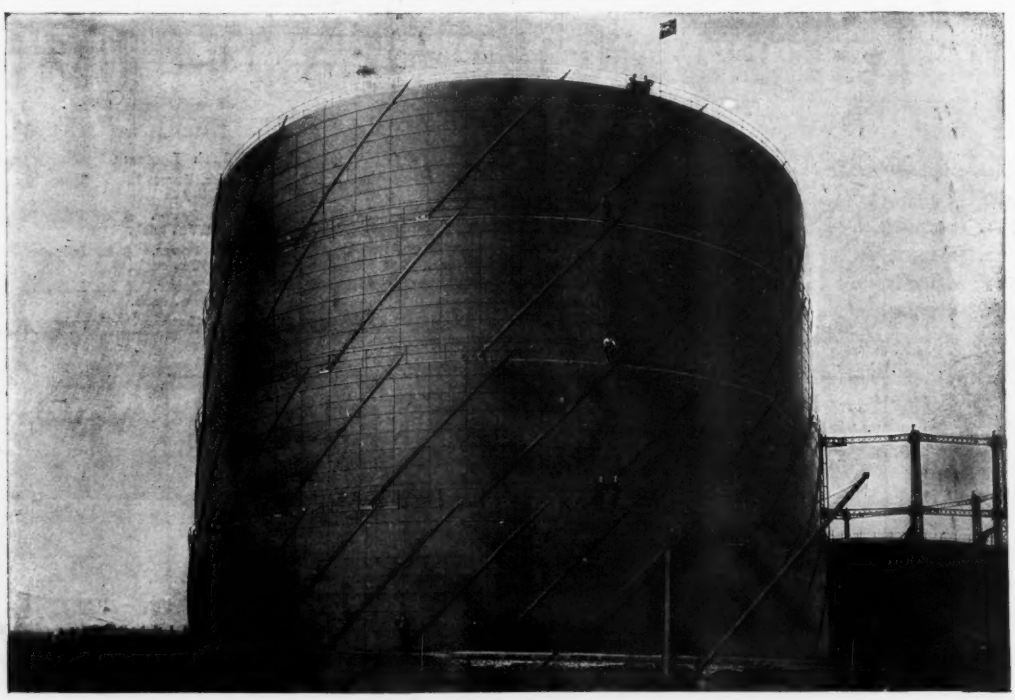
**HATTON GARDEN, LONDON, E.C.**

A.B.C. Code, 5th Edition, used. Telegrams: "PROMEROPE, LONDON," Telephone No. 6600 Central.

**LONDON. LEEDS. NOTTINGHAM.**

# CLAYTON, SON & CO., LTD., HUNSLET, LEEDS.

**Makers of the first Spiral Guided Holder (1889).**



**ANOTHER up-to-date Success in the Spiral Guiding of Gasholders (1909).**

Four-Lift Spiral Guided Gasholder (Clayton and Pickering's Patent Guides), capacity **1,636,000** cubic feet, just completed for the Wallasey Urban District Council, Seacombe, Cheshire.

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Of our Manufacture

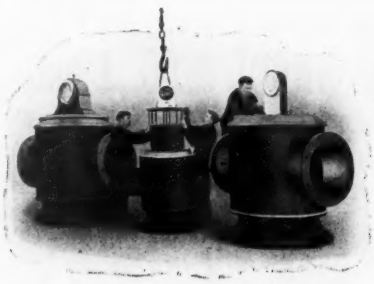
## STOP WASTE AND LEAKAGE

They are guaranteed not to contract and do not readily split and fracture but retain apparent wholeness after a long period of work.

**Top Quality FIRE-BRICKS, QUARRIES, &c.**

***High Grade Silica Bricks and Blocks for Combustion Chambers and Special Work.***

## WILLIAMSON, CLIFF, LTD., STAMFORD.



**OVER 600**

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## Station Meters

IN COMMISSION.

*Particulars from—*

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## PROJECTS AND INSTALLATIONS OF WATER-GAS-PLANTS

*On the Strache System.*

**STEAM-CONTROLLER for Water-Gas-Plants**

**RAISES** the Calorific Value up to 3000 Calories.
**REDUCES** the $CO_2$ Contents to 2 per cent.
**INCREASES** the Capacity of the Unit-Time.
**DIMINISHES** the Steam Consumption.
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**AUTOLYSATOR**

Apparatus for Use in Heating-Plants of All Kinds, registering continuously and visibly the $CO_2$.

**GASOSCOPE**

Apparatus serving to Find out the Leakage in Gas-Mains.

*Representative for England*:—G. PETTIGREW, THORNABY-ON-TEES, ENGLAND.

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Pepper Rd. Branch, Hunslet, Leeds.

Interior View of Works Employed in the Manufacture of WELDED STEEL MAINS for WATERWORKS Etc.

THE

# "DARWIN"

PATENT

## INVERTED BURNERS.

No. 3 "DARWIN." 3½in. Fitting.

Have been remodelled, and we now offer you

**BETTER BURNERS**

AT

**REDUCED PRICES**

And guarantee the highest finish and Workmanship.

Independent Test by a well-known Gas Manager of No. 3 Burner.

**CONSUMPTION . . . 3·55 ft.**

of Gas at 15/10ths Pressure,

**CANDLE POWER . . . 122·76**

These figures speak for themselves.

**Breakage of Mantles and**

## MAINTENANCE CHARGES

**Reduced to a minimum.**

Made in 3 SIZES and 8 PATTERNS

BY

## CHARLES JOYNER & CO., LIMITED,

**Icknield Square,**

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"VITERNUS" FOR
PAINT GASHOLDERS.
Makers: JOHN E. WILLIAMS & CO., Lower Moss Lane, MANCHESTER, S.W.

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VOLUMES OF THE "JOURNAL"
*PRICE* **2s.** *EACH.*

"COALEXLD."
Where this Fuel is Manufactured, **the strongest evidence of its advantages** to the Gas Engineering World **is seen by the absence of Stocks of Coke,** as the daily Sales of **Coalexld** clear the Stock as Manufactured.
*For further Particulars, apply to—*
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ARROL-FOULIS
Stoking Machinery
HYDRAULIC COKE PUSHERS
(HUNTER and BARNETT'S PATENT).
WILL DISCHARGE A RETORT IN ONE OPERATION
LARGE NUMBERS IN USE.
Full Particulars may be obtained from the Sole Makers,
SIR WILLIAM ARROL & CO., Limited,
GLASGOW.
[See Illustrated Advertisement, Aug. 10, p. 420.]

THE WIGAN COAL & IRON CO., LIMTD.,
Are the exclusive Owners of the well-known HAIGH HALL & KIRKLESS HALL GAS COAL COLLIERIES, Wigan, and of the Manton Steam and House Coal Collieries, Worksop, Notts, and supply the well-known Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, Cannel Nuts, House and Steam Coals, &c.
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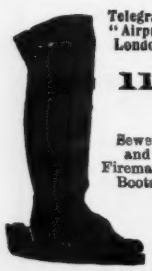
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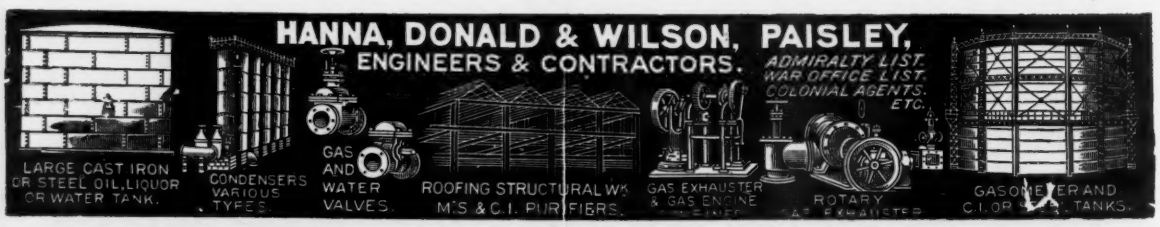
Telegrams: "Airproof, London."
THOMAS BUGDEN & CO.,
Telephone: 743 City.
*India-Rubber and Airproof Manufacturers and General Contractors,*
116-118, GOSWELL ROAD, LONDON, E.C.
Largest Manufacturers of Gas Main Bags.
Patentees of the DENMAR BAG,
Impervious to Main Liquor and Climatic Influences.
Oilskin Clothing, Diving and Wading Dresses, Sewer Boots, Tar Hose, Stokers' Mitts, Bellows, &c.

Gas Bags for repairing Mains. All Seams Stitched and Taped.

Gas Bags for repairing Mains. All Seams Stitched and Taped.

Contractors' and Mine Jackets.


HANNA, DONALD & WILSON, PAISLEY.
ENGINEERS & CONTRACTORS.
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ETC.
LARGE CAST IRON OR STEEL OIL, LIQUOR OR WATER TANK.
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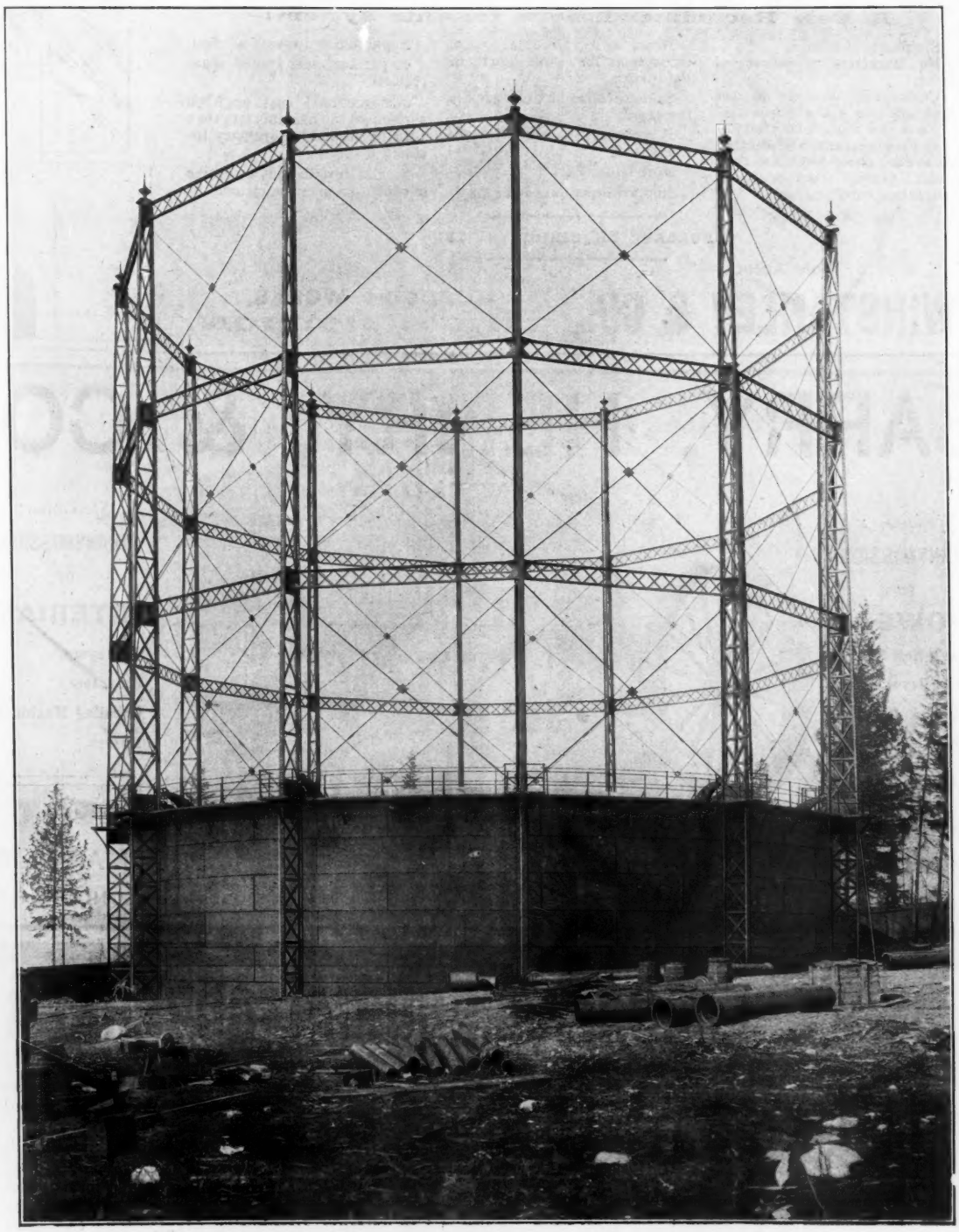
GAS EXHAUSTER & GAS ENGINE
ROTARY GAS EXHAUSTER
GASOMETER AND C.I. OR

JOHN BROWN & CO., LTD., SHEFFIELD,
Proprietors of
ALDWARKE MAIN, CAR HOUSE, & ROTHERHAM MAIN COLLIERIES, NEAR ROTHERHAM.
ALDWARKE MAIN GAS COAL
Analysis: 12,600 Feet of 19-Candle Gas per Ton.
Value in Pounds of Sperm, 820·20.
VERY FREE FROM IMPURITIES.
TELEGRAMS: "ATLAS SHEFFIELD."

# Gasholders & Tanks



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THREE-LIFT GASHOLDER, OUTER-LIFT 100 FEET DIAMETER, IN STEEL TANK.
CAPACITY FIVE HUNDRED THOUSAND CUBIC FEET.

**C. & W. WALKER, LTD.,** DONNINGTON, NEWPORT, SALOP.
London Office: 110, CANNON STREET, E.C.

## GEO. R. LOVE'S

# INCLINES AT 45 DEGREES.

### CARBONIZATION MADE EASY.

**A Few Recommendations for this System:—**

Simplicity of Design.
No **Machinery** to get out of order.
Carbonizing charges **40 per cent. less** than with Horizontals.
No skilled Stokers necessary.
Yield of Gas per ton guaranteed about 1000 cubic feet more than under present conditions, of guaranteed candle power.

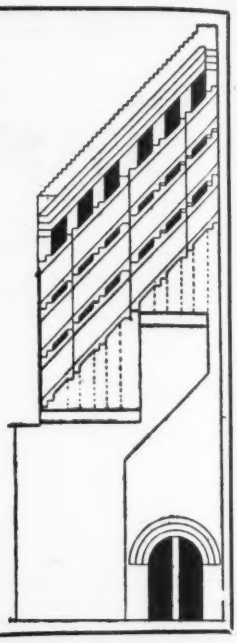
Heats under absolute control throughout the whole length of the Retorts.
Saleable value of Coke greatly increased.
25 per cent. greater yield of Ammonia.
More liquid Tar.
Stopped Pipes unknown.

Naphthalene always in solution.
**45 per cent. less ground space required.**
**Constructional cost per Ton carbonized considerably less than with Horizontal or Ordinary Inclined Retorts.**
Several Installations in course of construction or completed.

**FULLEST ENQUIRIES INVITED.**

**Sole Agents:**

**WINSTANLEY & CO.,** MURDOCH WORKS, **KING'S NORTON.**



# BARRY, HENRY, & CO.,

— LIMITED. —

*Specialities:*
**TRANSMISSION OF POWER.**
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**Spur & Bevel Wheels,**
**Shafting & Couplings,**
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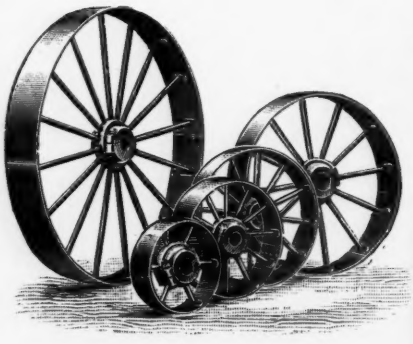
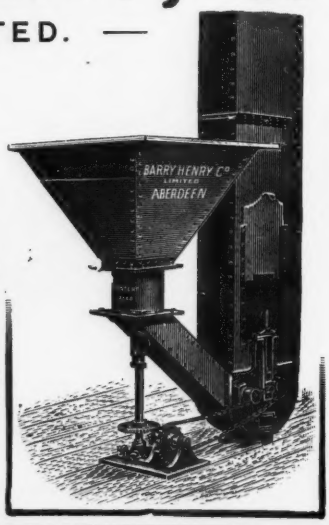
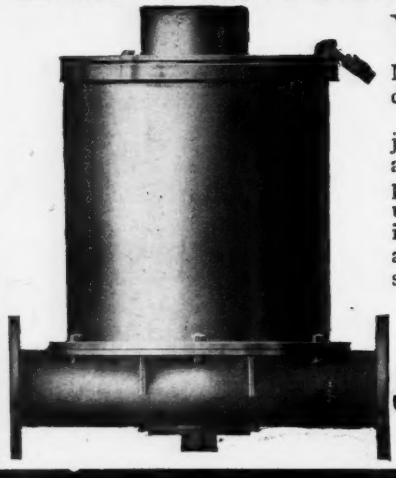





*Specialities:*
**TRANSMISSION OF MATERIALS.**
**Conveyors,**
**Elevators,**
**Grinding Machinery,**
**Motors.**

*AND*
**64, MARK LANE,**
LONDON, E.C.

# HIGH PRESSURE MERCURIAL GOVERNOR



WE have specially designed this Governor for use in places where it has been found necessary to raise the pressure in Gas Mains to several pounds per square inch, in order to meet the increased demands in districts where the Gas Mains are small.

This Governor is correctly compensated, and is so accurately adjusted that it will work as an ordinary low pressure Governor so long as the Inlet pressure is at least five-tenths more than the required Outlet pressure. This is particularly useful in the event of the Main being used as an ordinary low pressure distribution Main. The Governor is usually supplied for Inlet pressure of up to 5 lbs. per square inch, and Outlet pressure of from Zero to 6 inches; but, of course, it can be specially prepared to suit any desired range of pressure.

SIZES AND PRICES ON APPLICATION.

**JAMES MILNE & SON, LIMITED,**
**EDINBURGH. LONDON. GLASGOW. LEEDS.**

# Welsbach
## LIGHT
## Inverted Arc Lamp, Fig. 623.

**Storm Proof—**
**For Exterior Lighting.**

**Welsbach-Kern**
**(Patent) Inverted System**

**BRITISH MADE.**

**BRITISH MADE.**

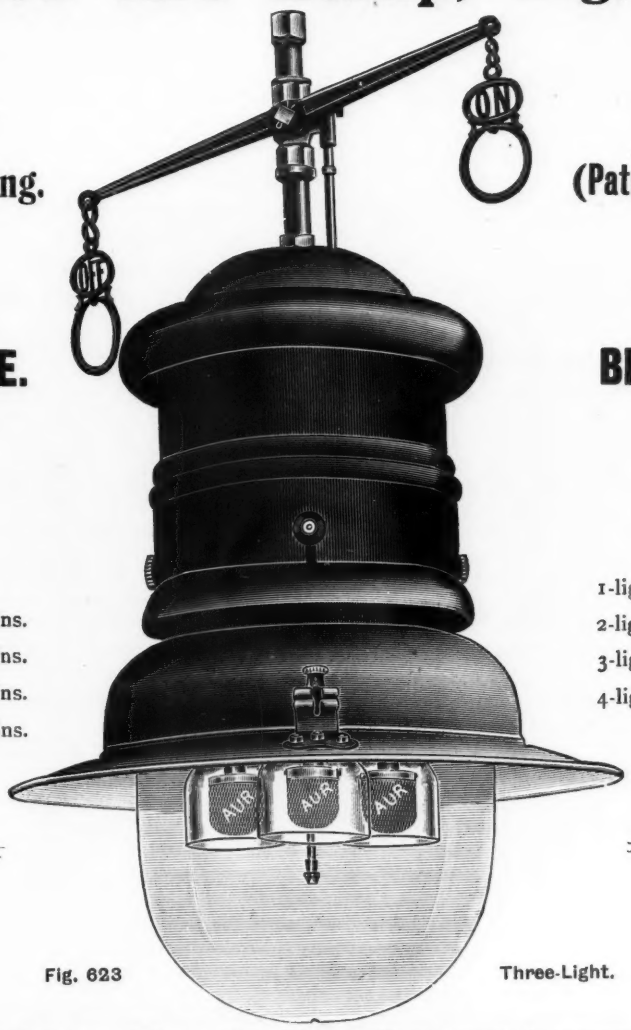



Fig. 623 Three-Light.

***Height over all.***

| | |
|---|---|
| 1-light . . . | 1 ft. 8 ins. |
| 2-light . . . | 2 ft. 4 ins. |
| 3-light . . . | 2 ft. 4 ins. |
| 4-light . . . | 2 ft. 7 ins. |

***Width over all.***

| | |
|---|---|
| 1-light . . . | 1 ft. 1 in. |
| 2-light . . . | 1 ft. 5 ins. |
| 3-light . . . | 1 ft. 5 ins. |
| 4-light . . . | 1 ft. 8 ins. |

**ENAMELLED Green Steel Casing, fitted with Welsbach-Kern Inverted Burners, Gas and Air Regulators operated from outside. Sliding Door to give access to Burners for cleaning purposes. Fitted with Magnesia Nozzles, Welsbach Mantles, and Glass Mantle Protectors. Complete as shown. Highly efficient and regenerative.**

| | *Gas per hour.* | *C.P.* | *Steel.* | *Copper Case.* | | *Gas per hour.* | *C.P.* | *Steel.* | *Copper Case.* |
|---|---|---|---|---|---|---|---|---|---|
| 1-light | 4 feet | 125 | **30/-** | **5/-** extra. | 3-light | 12 feet | 400 | **52/6** | **6/-** extra. |
| 2-light | 8 feet | 260 | **47/6** | **6/-** extra. | 4-light | 16 feet | 550 | **72/6** | **9/-** extra. |

All on or off, or One light on and the rest off, **7/6** per Lamp extra. Cup and Ball, **3/6** per Lamp extra.

**RENEWALS.**

Glass Mantle Protectors (Fig. 623) **3/4½** per dozen, or in case lots of 5 gross, **33/-** per gross.

| | *1-Light.* | *2-Light.* | *3-Light.* | *4-Light.* |
|---|---|---|---|---|
| Clear Glass Globes, each | **2/3** | **5/9** | **5/9** | **9/-** |
| „ „ „ In Case lots per dozen. | **19/6** | **57/9** | **57/9** | **93/-** |
| *Case contains* . . | *80* | *18* | *18* | *12* |

| | *1-Light.* | *2-Light.* | *3-Light.* | *4-Light* |
|---|---|---|---|---|
| Wired Globes, extra each | **2/-** | **2/-** | **2/9** | **3/6** |
| Parabolic Reflector, extra „ | **3/6** | **6/-** | **7/6** | Not made |

Welsbach Mantles, each **6d.** subject as usual.

The Welsbach Mantles for Upright lighting are "C," "CX," and "Plaissetty," price **4½d.** each.

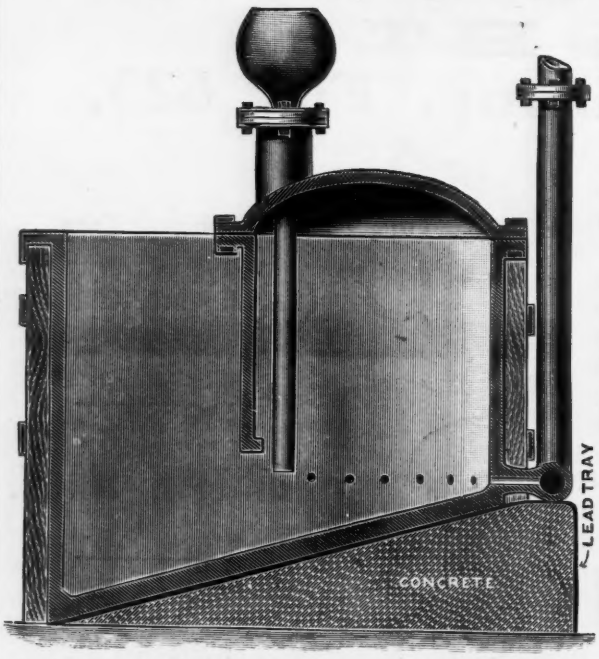
## THE WELSBACH INCANDESCENT GAS LIGHT CO., LTD.,
**Welsbach House, 344-354, Gray's Inn Road, London, W.C.**

*Telegrams and Cables: "WELSBACH LONDON."* *Telephone 2410 NORTH.*

# BIGGS, WALL & CO.

Telegrams: "RAGOUT LONDON."
Telephone: 273, CENTRAL.

MAKERS OF **SULPHATE** OF **AMMONIA PLANT.**




Section showing Williams and Fenner's Patent Outside Cracker Pipe as fitted to our Solid Lead Plate Saturator.

Sole Proprietors of Williams' and Fenner's Patent Saturator with Outside Cracker Pipe, for which we claim the following

**ADVANTAGES:—**

1. Equal distribution of Steam and Ammonia.
2. Perfect agitation and boiling of the Acid Liquor.
3. No possibility of local Alkalinity,
4. Consequently no formation of Blue Salt.
5. Sulphate is easily forced to point of discharge.
6. No incrustation.
7. No renewals of Cracker Pipe.
8. Capacity of output greatly increased.

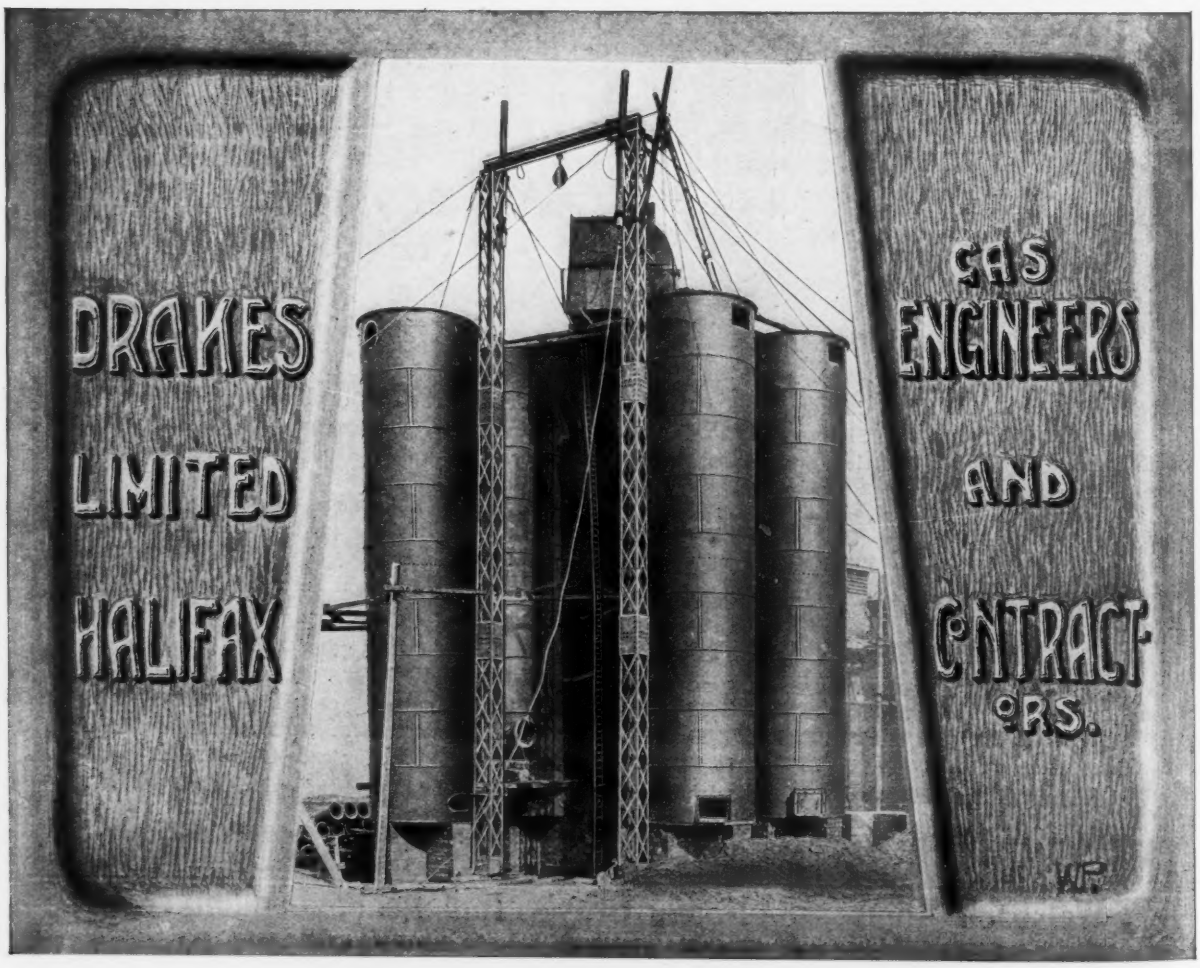
**IT CAN BE APPLIED TO ANY EXISTING SATURATOR.**

LICENCES TO MAKE MAY BE OBTAINED;
FOR FULL PARTICULARS APPLY TO

# BIGGS, WALL & CO.

13, Cross Street, Finsbury Pavement,
**LONDON, E.C.**





# ARTISTIC FITTINGS

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# "METROLITE" BURNER.

*NO TARNISHING OF FITTINGS.*

NEAREST APPROACH TO ELECTRICAL EFFECT.

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# MECHANICAL COAL HANDLING PLANTS

OF ANY MAGNITUDE

MADE AND ERECTED

BY

# GIBBONS

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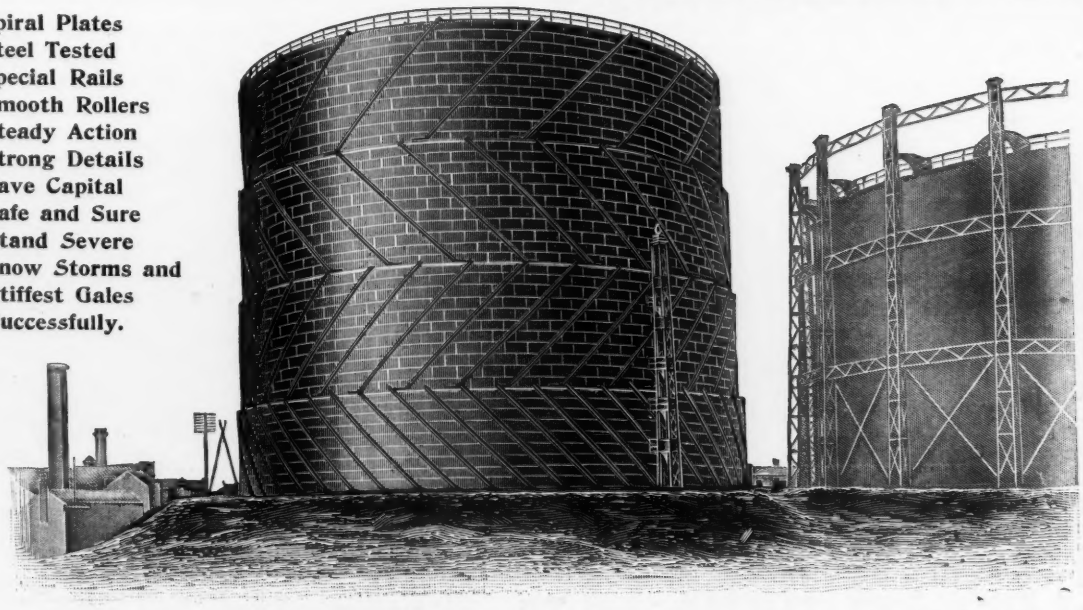
# R. & J. DEMPSTER, LIMITED,

**Leading Makers of SPIRAL GUIDED GASHOLDERS.**

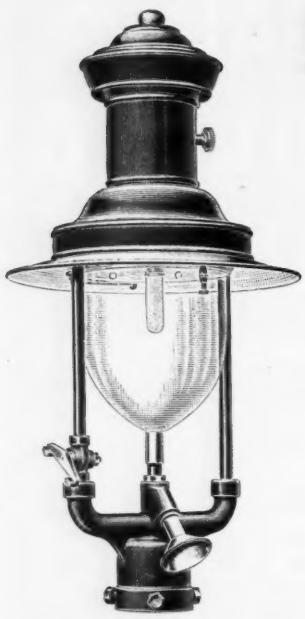
# MANCHESTER.

**Spiral Plates**
**Steel Tested**
**Special Rails**
**Smooth Rollers**
**Steady Action**
**Strong Details**
**Save Capital**
**Safe and Sure**
**Stand Severe**
**Snow Storms and**
**Stiffest Gales**
**Successfully.**



**From a Photograph showing the conversion of a Two-Lift Guide Framed Holder to a Four-Lift Spiral Holder of 3½ million cubic feet capacity, for the Newcastle and Gateshead Gas Company, to Plans and Specifications of W. D. GIBB, Esq., M.Inst.C.E., Engineer.**

# The KEITH LIGHT.



## 5500 INSTALLATIONS NOW IN USE.

Illustration shows our

## 1909 PATTERN INVERTED LAMP

adapted for Columns, and giving an efficiency of

**60-Candle Power per Cubic Foot.**

MADE IN VARIOUS SIZES, AND ARRANGED FOR ANY METHOD OF LIGHTING.

## JAMES KEITH AND BLACKMAN CO., LTD.,

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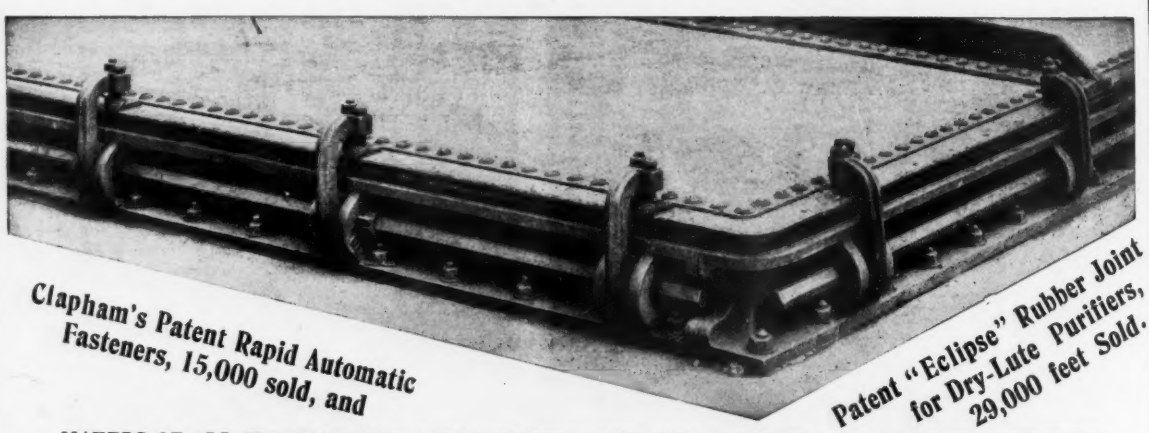
**Retort Mouthpiece, Improved Livesey-Washer, Clapham's Patent P. & A. Extractor, Ball-Washer Scrubber with Speed-Reducing Gear and Engine, Valves, Finish in Castings, and**



Clapham's Patent Rapid Automatic Fasteners, 15,000 sold, and

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*MAKERS OF ALL IRONWORK FOR CARBONIZING PLANTS FOR INCLINED OR HORIZONTAL SYSTEMS.*

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